



**Second Five-Year Review Report**  
**For The**  
**Carolawn Superfund Site**  
**Fort Lawn, Chester County, South Carolina**

**August 2003**

**PREPARED BY:**  
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**PREPARED FOR:**  
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**U.S. Environmental Protection Agency**

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Date: 8/29/03

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## **List of Acronyms**

ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
EW	Extraction Well
CFR	Code of Federal Regulations
ESD	Explanation of Significant Difference
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MW	Monitoring Well
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SDWA	Safe Drinking Water Act
SCDHEC	South Carolina Department of Health and Environmental Control
VOC	Volatile Organic Compound

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ROD	Record of Decision
RPM	Remedial Project Manager
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## **Executive Summary**

The remedy for the Carolawn Superfund Site Operable Unit 1 (OU1), as stated in the Record of Decision (ROD) dated September 27, 1989, included recovery of contaminated groundwater using extraction well technology and on-site treatment of extracted groundwater by equalization, filtration, and removal of volatile organic compounds (VOCs) by air-stripping. The groundwater remediation system began operation on October 9, 1996 and final inspection was conducted on October 10, 1996. The First Five-Year Review was conducted in 1998 and the Report was developed and signed on August 27, 1998.

The assessment of this second five-year review found that the remedial system is generally operating in accordance with the requirements of the ROD and the remedy is functioning as designed. Operation of the remedial system will continue until groundwater cleanup goals are achieved through recovery of contaminated groundwater using extraction well or other remedial technology. Currently, declining contaminant concentration trends are not apparent in several monitoring/recovery wells. Consequently, this assessment recommends a detailed "system optimization" evaluation and a follow-up action plan be developed by May 30, 2004 for the purpose of identifying whether system enhancements or other changes can be implemented to improve the effectiveness of the remedy in achieving the remedial goals set forth in the ROD. The "system optimization" evaluation should also consider other remedial technologies that could be implemented to enhance the groundwater cleanup at this Site.

### Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Carolawn Superfund Site		
EPA ID: SCD980558316		
Region: 4	State: SC	City/County: Fort Lawn / Chester County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple OUs? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Construction completion date: <u>10</u> / <u>10</u> / <u>1996</u>
Has site been put into reuse? <input type="checkbox"/> YES <input type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input type="checkbox"/> EPA <input checked="" type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Yvonne Jones		
Author title: Remedial Project Manager		Author affiliation: U.S. EPA, Region 4
Review period: <u>5</u> / <u>28</u> / <u>2003</u> to <u>8</u> / <u>27</u> / <u>2003</u>		
Date(s) of site inspection: <u>6</u> / <u>20</u> / <u>2003</u>		
Type of review: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input checked="" type="checkbox"/> Post-SARA    <input type="checkbox"/> Pre-SARA  <input type="checkbox"/> Non-NPL Remedial Action Site  <input type="checkbox"/> Regional Discretion               </div> <div> <input type="checkbox"/> NPL-Removal only  <input type="checkbox"/> NPL State/Tribe-Lead  <input checked="" type="checkbox"/> Statutory Review               </div> </div>		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div> <input type="checkbox"/> Actual RA On-site Construction at OU #  <input type="checkbox"/> Construction Completion  <input type="checkbox"/> Other (specify)               </div> <div> <input type="checkbox"/> Actual RA Start at OU# <u>NA</u>  <input checked="" type="checkbox"/> Previous Five-Year Review Report               </div> </div>		
Triggering action date: <u>8</u> / <u>27</u> / <u>1998</u>		
Due date: <u>8</u> / <u>27</u> / <u>2003</u>		

## **Five-Year Review Summary Form, cont'd.**

### **Issues:**

In some areas (MW-5, MW-6, EW-1, EW-3R, EW-4, and EW-5), the groundwater contaminant concentrations are variable and declining trends have not been established. In addition, groundwater monitoring wells MW-10A, MW-10B, MW-11A and MW-11B in the vicinity of the Fishing Creek, have contaminant concentrations that may or may not be measurably influenced or captured by the existing extraction system.

### **Recommendations and Follow-up Actions:**

A system optimization evaluation that may include, but not be limited to, 1) shut-down and sampling of all wells, 2) aquifer pump testing, 3) increase in pumping potentials from existing system, 4) additional plume characterization for remediation purposes, 5) abandonment of monitoring and extraction wells, 6) installation of monitoring and extraction wells, and 7) evaluation of other remedial approach in addition to or in place of existing extraction system as deemed appropriate.

This evaluation should be completed and a follow-up action plan developed by May 30, 2004.

### **Protectiveness Statement(s):**

All immediate threats at the site have been addressed, and the remedy is protective of human health and the environment under current conditions, which are not expected to change. Operation of the existing groundwater remedial system, or other remedial approach as may be appropriate in the future, will continue until groundwater cleanup goals are achieved.

### **Long-term Protectiveness:**

Long-term protectiveness of the remedial action will be verified by continued monitoring of groundwater to fully evaluate potential migration of the contaminant plume downgradient from the treatment area and towards Fishing Creek. Data indicate that the majority of the plume remains on the Site, however, there are some areas of the groundwater plume where hydraulic control should be further evaluated. Current monitoring data indicate that the remedy is generally functioning as designed to achieve groundwater cleanup goals.



## Section 1. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to further evaluate and address them as necessary.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The EPA-Region 4 in conjunction with SCDHEC conducted the five-year review of the remedy implemented at the Carolawn Superfund Site in Fort Lawn, South Carolina. This review was conducted for the Site from May 2003 through August 2003. This report documents the results of the review.

This is the second five-year review for the Carolawn Site. The triggering action for this statutory review is the completion and signing of the first five-year review completed on August 27, 1998. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

## **Section 2. Site Chronology**

**Table 1 - Chronology of Site Events**

<b>Event</b>	<b>Date</b>
Site first used for solvents/waste storage facility	1970
Initial operations to dispose of the inert waste from approximately 2000 drums	1975
Permit issued by SCDHEC for one-time disposal of 300-400 drums with inert waste	1978
Site abandoned by Carolawn Company	1980
Site Investigation conducted by EPA and SCDHEC (Indicated presence of contamination (VOCs-TCE and metals) on the site and nearby residential wells)	1980
EPA initiated cleanup activities at the site	12/1981
EPA proposes the site for inclusion on the NPL	12/1982
Carolawn Site was listed on the NPL	9/1983
Four nearby residents connected to alternative water supply	Early/1985
PRPs entered into an Administrative Order on Consent (To remove 17 storage tanks Off-site and dispose of waste content at an incinerator)	5/1985
PRPs conducted RI/FS for OU1 (fenced area of the site) pursuant to a partial Consent Decree	1985-1989
ROD for OU1 was signed (selected the remedy for groundwater cleanup based upon $1 \times 10^{-6}$ carcinogenic risk factors and proposed MCLs)	9/1989
RD/RA Work Plan was developed and approved	1991-1992
RI/FS was initiated for OU2 (area outside of the fence – soils, surface water and sediment in Fishing Creek)	1992
ROD for OU2 was signed (No-further Action remedy for the land located immediately around the fenced area)	9/1995
Remedial Action for OU1 was formally initiated	5/1993
Groundwater Recovery system was installed	1995-1996
SCDHEC issues a NPDES Permit for discharge of treated water to Fishing Creek	1996
Operation and Maintenance of the groundwater extraction system was initiated	10/1996
NPDES Permit was Modified	4/1998
Close Out Report was developed	5/1998
First Five-Year Review was conducted and Report Signed	8/1998

### **Section 3. Background**

The Carolawn Site is an approximate 60-acre abandoned waste storage, treatment, and disposal facility located in Fort Lawn, Chester County, South Carolina (Attachment A). The Site, shown in Attachment A, is situated less than three miles west of Fort Lawn, the closest population center to the Site, and approximately one-half mile south of South Carolina Highway 9 at latitude of 34° 41' 10 " north and longitude 80° 56' 35" west.

Rural and agricultural areas surround much of the Site. The Lancaster & Chester Railroad and County Road 841 border the Site to the south and Fishing Creek borders the Site to the east. Fishing Creek is a tributary to the Catawba River. Wooded areas and cultivated fields lie to the west and north of the Site. Soybeans have been historically planted in these fields. Fort Lawn had a population of 864 according to the 2000 U.S. Census.

Approximately five acres of the Site were affected by the hazardous waste storage, treatment, and disposal activities, three of which are enclosed in a chain-linked fence (Operable Unit 2 consist of the area outside the fence). Disposal activities at the Site began in 1970 and ended in 1980, when the Site was abandoned. Located within a two mile radius of the Site are approximately thirty (30) permanent, single family residences, most of which are along South Carolina Highway 9. At one time, there were four residences located within 300 yards of the fenced area with a fifth residence located approximately 1,000 yards to the west of the site. One of these dwellings was located between the site and Fishing Creek (Attachment A & B).

Natural resources in the area of the Site include water, soils, flora, and fauna. The waters of Fishing Creek are occasionally used for fishing and other recreational activities, but topography and poor accessibility limit the use of the creek in the vicinity of the Site. Fishing Creek flows southward past the site and eventually empties into the Catawba River, eight miles south of the Site and above Great Falls, South Carolina, where approximately 2,500 people receive their water supply from the Catawba River.

The residential, commercial, and industrial establishments within the City of Fort Lawn receive their water supply from the Chester Metropolitan Sanitary District (MSD), whose water intake on the Catawba River is approximately four miles east of the Site and above the confluence of Fishing Creek and Catawba River. The four residences closest to the Site who used private wells were provided an alternative water source in 1985 and connected to the Chester MSD.

#### **A. Physical Characteristics**

The Carolawn Site is located in the eastern Charlotte Belt of the Piedmont Physiographic Province of South Carolina. This belt is characterized by granitoid gneisses with strong compositional layering, probably derived from sediments. The bedrock in the vicinity of the Site consists of Lower Metadiorite and Metagabbros. The complex is cut by pegmatite granite and mafic dikes.

The upper regions of the bedrock have been altered by in-situ weathering. This weathering has produced a partially to highly decomposed mixture of rock and soil, which is referred to as saprolite. Saprolite retains the vestigial mineralogy and structure of the original rock.

The bedrock beneath the Site has undergone several episodes of deformation. These events created joints and fractures. These structural features influence groundwater flow within the crystalline bedrock. The major structural features noted at the Carolawn Site were joints and dikes.

The major hydrostratigraphic unit beneath the Site is the granodiorite bedrock. Saturated conditions were not encountered in the Residuum/Saprolite unit. Conditions may usually be saturated, but the RI was conducted during an extended drought and only unsaturated conditions were encountered in this unit. The groundwater in the bedrock is associated with the joints and fractures.

All groundwater in South Carolina is classified as Class GB Waters (South Carolina Regulation 61-68). This classification means that all groundwater meeting the definition of underground sources of drinking water (USDW) meet quality standards set forth in the State Primary Drinking Water Regulations (R.61-58.5). An USDW is defined as an aquifer or portion of an aquifer that supplies or contains sufficient quantity of water to supply a public supply system.

#### **B. History of Contamination and Response Action**

The Carolawn Site was originally owned by the Southeastern Pollution Control Company (SEPCO) of Charlotte, North Carolina. Beginning in 1970, SEPCO used the Site as a storage facility for a solvent recovery plant located in Clover, South Carolina. SEPCO went bankrupt in 1974 and abandoned the Site, leaving approximately 2,500 drums of solvent on Site. SEPCO had been storing the drummed solvents in anticipation of incinerating the waste. However, neither an incineration permit nor a storage/disposal permit was issued to SEPCO by SCDHEC.

In January 1975, as part of the clean up effort to clean up the SEPCO plant in Clover, South Carolina, Columbia Organic Chemical (COCC) transported and stored the waste of approximately 2,000 drums at the Carolawn Site. As payment for services rendered during the cleanup of the plant in Clover, South Carolina, COCC received the Carolawn property. After 1975, South Carolina Recycling and Disposal, Inc. (SCRDI), a subsidiary of COCC, controlled the Site. During 1978, SCRDI obtained a permit from SCDHEC for a one-time disposal of 300-400 drums containing inert waste.

In October 1978, SCRDI was given approval to dispose of empty drums on the 3-acre fenced portion of the property. After the disposal, SCRDI sold the 3-acre fenced area of the Site to the Carolawn Company. Between 1978 and 1980, the Carolawn Company conducted waste storage, treatment, and disposal operations within the three-acre Site that was enclosed by a chain linked fence. When the Site was subsequently abandoned in 1980 by the Carolawn Company, the fenced area contained a diked area for storage of tanks and drums, two incinerators, two storage

trailers, 14 storage tanks, and over 400 drums containing liquid and solid wastes. Over 600 drums and 11 tanks were also located outside the fenced area to the west and north of the Site.

During the early 1980's, SCDHEC and EPA conducted Site investigations at the Carolawn Site. These investigations included collecting environmental and private residential well samples for analysis. The result of these investigations showed the presence of trichloroethylene (TCE) and other solvents in nearby residential wells. The results also indicated that the Site was contaminated with high levels of metals and organic compounds. Due to the elevated levels of contamination found and the potential imminent threat for damage to public health and/or the environment, EPA initiated cleanup activities at the Site on December 1, 1981. The cleanup activities continued through February 1982 and included removal of contaminated soils, drums, and liquid waste from the Site.

Subsequently, in December 1982, the Site was proposed for inclusion on the National Priorities List (NPL). The Carolawn Site was finalized on the NPL in September 8, 1983. Since continued sampling of at least one of the local residential wells showed persistently high levels of VOCs during different sampling events, the Chester Municipal Sewer District's water main from Highway 9 was extended to four residences living near the Site. These four residents were connected to this alternative water supply in 1985.

In May 1985, a group of Potentially Responsible Parties (PRP's - the Carolawn Steering Committee) entered into an Administrative Order on Consent to remove 17 storage tanks off-Site and dispose of the waste contents at an incinerator. In addition, the PRPs treated the water from decontamination activities and excavated and disposed of contaminated soils. Pursuant to a Partial Consent Decree, the PRPs conducted a Remedial Investigation and Feasibility Study (RI/FS) for OU1 between 1985 and 1989. The RI/FS confirmed the presence of volatile organic compounds (VOCs) in the groundwater exceeding Maximum Contaminant Level (MCLs). It was also determined that due to the effectiveness of the removal actions, no source of contamination remained within the fenced area of the Site. However, the findings documented in the RI for OU1 indicated that limited soil data was collected from the west and north drum areas located outside the fenced area (OU2), requiring collection of additional samples to confirm the presence or absence of residual soil contamination in these areas.

#### **Section 4. Remedial Actions**

As noted in the previous 5-year assessment, the remedial action objectives (RAOs) include the following: (1) eliminating or minimizing the threat posed to public health and the environment from current/future mitigation of hazardous substances in groundwater; (2) reducing hazardous substance concentration levels and; (3) reducing the mobility, toxicity and/or volume of hazardous substances. At this Site, the selected remedy established clean-up goals for contaminants in the groundwater based upon  $1 \times 10^{-6}$  carcinogenic risk factors and existing or proposed MCLs. The selected remedy eliminates potential impacts to the human health and the environment by mitigating further migration of VOCs in the groundwater and by treating groundwater to health-based clean-up levels.

#### **A. Remedy Selection**

On September 27, 1989, EPA issued a Record of Decision (ROD) for OU1 which selected the following remedy:

- Recovery of contaminated groundwater using extraction well technology,
- On-Site treatment of groundwater by equalization, filtration, and removal of VOCs by air-stripping,
- The following are alternatives for discharge of treated groundwater: (1) the local sewer system; (2) Fishing Creek via a National Pollution Discharge Elimination System permit (NPDES); (3) on-Site irrigation or; (4) possible groundwater injection. The most cost effective combination for the point of discharge and the degree of treatment will be determined in the Remedial Design stage. In addition, concurrence on the final Remedial Design will be required from SCDHEC and the public.
- Upon the condemnation of the contaminated adjacent and previously abandoned private potable wells by the County of Chester, these wells will be plugged in accordance to SCDHEC regulations. Additional fieldwork will be required in the disposal area north of the fenced area consisting of the installation of soil borings to verify the presence or absence of contamination in this area.

#### **B. Remedy Implementation**

In accordance with the Remedial Design/Remedial Action Work Plan, from December 1991 through May 1992, the Carolawn Steering Committee (through its contractor Conestoga Rovers & Associates) implemented several components of the Remedial Action, which included the closure of at least three residential wells which were no longer in use, appropriate closure of the RI Decontamination area and installation of a water service to a resident. In an effort to address components of the ROD for OU1, EPA conducted a RI/FS on OU2, focusing mainly on soil (surface/subsurface), surface water, and the sediment in Fishing Creek. On September 21, 1995, EPA issued a ROD for OU2, which selected a "no-further action" remedy for land located immediately around the fenced area. This consisted of land located north and west of the fenced area. Furthermore, based on several comments and concerns received during a public comment period for the Remedial Design for OU1, EPA, in consultation with SCDHEC, selected discharge to Fishing Creek via NPDES permit (SCO0447538) as the alternative for discharge of treated groundwater.

The Remedial Action was formally initiated on May 12, 1993, upon EPA's approval of the Remedial Design. The groundwater extraction system was constructed by CRA and ENSR under the direction of EPA and SCDHEC. The complete groundwater recovery and treatment system was installed during the period of December 1995 through June 8, 1996. The groundwater recovery system consists of five groundwater extraction wells, all requiring hoses and piping to transmit recovered fluids from the wells to the treatment building. Each extraction well is

equipped with a pneumatic submersible pump and associated level sensors/controls. The treatment system consists of two processes, which may be operated separately or in series configuration. The treatment processes are identified as the Air Stripping/Clarification process and the Bag Filter/Granular Activated Carbon (GAC) Adsorption process. It is intended that the Air Stripping/Clarification process be utilized as the primary treatment process. The Bag Filter GAC Adsorption process may provide treatment while the Air Stripper is being maintained.

On December 7 1995, ENSR, a subcontractor of Conestoga-Rover & Associates was issued the Notice to Proceed for construction activities. ENSR proceeded with submittals and placing material orders. Mobilization of trailers and setup of the Site support area were completed during the week of January 15, 1996

The discharge line was installed between February 20, 1996 and March 14, 1996. Completion of the access road was executed from April 10, 1996 to April 16, 1996.

The treatment building excavation was completed on March 5, 1996, and the dewatering bed and sump chamber were installed on March 9, 1996. Installation of the force mains was performed concurrently with construction of the treatment building.

Trenching, installation, and backfilling of the force mains and electrical conduits were completed from April 2, 1996 to April 18, 1996.

The groundwater extraction well pumps were installed on April 23, 1996 and April 24, 1996. Installation of mechanical components occurred from May 11, 1996 to June 5, 1996.

Construction of the groundwater remediation system was completed on June 8, 1996. SCDHEC completed a Pre-Final Inspection of the groundwater remediation system on June 11, 1996, while the EPA conducted this same inspection on June 12, 1996. Minor construction items were identified during the week of June 10, 1996, however, all items were completed by July 5, 1996. The Permit to Operate the groundwater remediation system was issued on June 14, 1996. Commissioning of the groundwater remediation system began on June 15, 1996. However, the commissioning period was reduced to two weeks as negotiated with SCDHEC, due to the fact that the NPDES permit had not been finalized. Operation and maintenance of the groundwater remediation system began on October 9, 1996. The EPA in conjunction with the Carolawn Community Advisory Group, conducted a Final Inspection on October 10, 1996. Between October 10, 1996, and August 1997, the PRP's operated the groundwater recovery and treatment system during Consent Decree (Amendment) negotiations. The PRP's are currently operating the groundwater recovery and treatment system pursuant to a Unilateral Administrative Order (UAO) issued by EPA on July 28, 1997. The UAO requires that operation of the groundwater extraction continue until the cleanup goals set forth in the ROD are achieved.

Concurrent with the operation of the groundwater recovery and treatment system, the Carolawn NPDES Permit was modified on April 2, 1998, which allowed the use of a diffuser requiring only effluent chronic testing at the in-stream waste concentration of 1.02%, in lieu of the then

current acute test at 100% effluent. The Preliminary Close Out Report was delayed until May 18, 1998, after the permit modification was approved by SCDHEC.

### **C. System Operation and Maintenance**

O'Brien & Gere Inc. of North America (O'Brien & Gere) have conducted semi-annual ground water sampling and quarterly treatment performance monitoring including the annual three-day treatment performance monitoring since 1998. Ground water samples and water level measurements were collected in accordance with the Site O&M Sampling Plan. The Carolawn Steering Committee will continue to conduct operation, maintenance and monitoring activities at the Carolawn NPL site, as scheduled in the O & M Sampling Plan. Routine O&M activities were performed by O'Brien & Gere including weekly site inspections of the treatment facility and wellhead locations for damage, theft or breach of security. Equipment and control systems are functioning within operational limits.

The Carolawn Steering Committee has spent approximately \$1.7 million since system startup in October 1996. During the past five years, O&M costs have typically averaged less than \$200,000 per year.

### **Section 5. Progress Since the Last Five-Year Review**

The first five-year review was conducted on August 27, 1998, which is little more than one year after the groundwater remedial system began operating. In some areas (MW-5, MW-6, EW-1, EW-3R, EW-4, and EW-5), the groundwater contaminant concentrations are variable and declining trends have not been established. In addition, groundwater monitoring wells MW-10A, MW-10B, MW-11A and MW-11B in the vicinity of the Fishing Creek, have contaminant concentrations that may or may not be measurably influenced or captured by the existing extraction system. Data indicate that the majority of the plume remains on the Site, however, there are some areas of the groundwater plume where hydraulic control should be further evaluated. Current monitoring data indicate that the remedy is generally functioning as designed to achieve groundwater cleanup goals.

### **Section 6. Five-Year Review Process**

#### **A. Administrative Components**

EPA Region 4 initiated the second five-year review on May 21, 2003. The EPA-Section Chief notified SCDHEC of this review and also discussed the intentions of SCDHEC to take the lead in conducting this second five-year review. As a result of this discussion the SCDHEC initiated the second five-year review on May 27, 2003. EPA and SCDHEC held a two-day meeting to discuss and plan the details and requirements of this five-year review. The components of this



five-year review consisted of community involvement, data/document review, site inspection, and interviews as summarized below.

#### **B. Community Involvement**

Activities to involve the community in the five-year review were initiated with a notice that was sent to two local newspapers that a second five-year review was to be conducted by August 27, 2003. This notice was posted in the Lancaster News and the Chester News on June 11, 2003. Copies of this notice from both newspapers are provided in Attachment G of this report.

Within thirty (30) calendar days of the report finalization, a notice will be published in the same local newspapers announcing that the Second-Year Review report for the Carolawn Superfund site is complete, and that the results of the review and the report are available to the public at the Chester County Library (100 Center Street, Chester, SC 29706; Ph: 803-377-8145) and the Lancaster County Library (313 South White Street, Lancaster, SC 29720; Ph: 803-285-1502). This report will also be placed in the Administrative file both at EPA Region 4 and SCDHEC offices.

#### **C. Document Review / Data Review**

This five-year review consisted of a review of relevant documents including O&M records and monitoring data (See Attachment D, E, and F).

As the remedy was to cleanup the contaminated groundwater using extraction well technology, the groundwater monitoring has been conducted at the Carolawn Site for the past six years under operating conditions. This monitoring included measurement of water level elevations, contaminant concentrations, and volume of extracted groundwater. Annual Reports have been developed for the last five years that presented the monitoring data, statistical analysis, system monitoring methodologies, summary of groundwater hydraulics and monitoring data, discussion of analytical results, effectiveness of the remedial system, and the recommendations for the next year.

No potentially toxic or mobile degradation products have been identified during sampling events that were not already present at the time of the ROD, and therefore all contaminants detected have cleanup goals specified in the ROD.

Regarding plume migration, the hydraulic control of the current recovery system does not appear to have significantly influenced or captured the contaminant concentrations in the vicinity of downgradient groundwater wells MW-7, MW-8, MW-10B, MW-10A, MW-11A, MW-11B and MW-13 after approximately 6.5 years of operation. From the data presented in the annual reports, it appears that the concentrations in these wells are variable and generally remain within or slightly below the concentration ranges prior to groundwater extraction, based on the sampling data collected over the last five years. The statistical analysis of the TCE concentrations using EPA methodology (presented in the Annual Reports) does indicate current declining trends in

groundwater for wells MW-4, MW-5, MW-6 and downgradient wells MW-7, MW-8, MW-10A, MW-11A, MW-12 and EW-5, which may be confirmed with additional future sampling data. For the groundwater recovery wells, the contaminant concentrations have significantly declined for wells EW-2R and EW-3R compared to pre-extraction concentrations. The contaminant concentrations for extraction well EW-4 also exhibit a declining trend. The Data showing the contaminant concentrations measured in last five years are presented in Attachments E and F.

Monitoring data were not collected from MW-9 because it has been consistently dry. One of the reasons for it being dry may be its close proximity to the extraction well EW-1. Based on the site conditions encountered during installation, extraction wells EW-2 and EW-3 were replaced with extraction wells EW-2R and EW-3R. EW-2 and EW-3 were subsequently converted to monitoring wells and the monitoring well network was expanded to include these wells as such. Further evaluation is required to support the system optimization activities as recommended in this report as well as annual reports.

Discharge sampling is conducted monthly in accordance with the O&M Sampling Plan and the SCDHEC NPDES permit for the site. Samples for laboratory analysis (Volatile Organic Compounds (VOCs) and chronic toxicity) are collected during the second week of the month. Based on data from the discharge sampling, the air stripper is effectively reducing the concentration of halogenated VOCs to levels less than the detection limit. Accordingly, effluent discharges met the SCDHEC NPDES permit requirement.

#### **D. Site Inspection**

Inspection at the Site was conducted on June 20, 2003. The purpose of the inspection was to assess the protectiveness of the remedy, including the protectiveness of the wells and on-site treatment system. Representatives from SCDHEC Bureau of Land and Waste Management, EPA Region 4, and O'Brien & Gere Engineers, Inc. participated in this site inspection. The site inspection included walking the site, inspecting all groundwater monitoring and extraction wells, inspecting the on-site groundwater treatments system, and ensuring the access controls to the site. No significant issues have been identified at any groundwater wells protection structures, extraction well structures, groundwater treatment system setup, or the fence.

The Site inspection check form and site photographs are provided in the Attachment I.

#### **E. Interviews**

Interviews were conducted with various parties connected to the site. Yvonne Jones and Al Cherry (RPM, EPA Region 4) were interviewed on May 28-29, 2003. A conference call on June 9, 2003 served as an initial interview with the PRP (Amy Magee – King & Spalding LLP) and their contractors (Ken Jones and Michael Kozar - O'Brien & Gere Engineers, Inc.). Interviews were also conducted during the site inspection on June 20, 2003. In summary, these interviews discussed the information presented in the document review section of this report. Also, discussed was the five-year review process and a need to accomplish the second five year review

for this Site together as a team effort. Information presented in the Site Inspection Check List also resulted due to the interviews conducted on June 20, 2003. The interview documentation form is attached in Attachment G.

## **Section 7. Technical Assessment**

### **A. Question A: Is the remedy functioning as intended by the decision documents?**

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate that the remedy is generally functioning as intended by the ROD. Opportunities for system optimization were observed during this review. The monitoring well network provides sufficient data to assess the progress of extraction system within parts of the plume area but some areas may require additional monitoring wells. There is some concern with the influence and capture of the groundwater extraction system and its effects on the plume in the vicinity of MW-7, MW-8, MW-10 A, MW-10B, MW-11A, MW-11B, and MW-13. Concentrations of TCE in most of the monitoring wells have remained relatively stable within last five years, and some are lacking the downward trend in concentrations for this contaminant (See Attachment E). This may be an indication that the groundwater plume may not be effectively influenced or captured by the existing extraction well network after 6.5 years of operation.

### **B. Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?**

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considered: The Groundwater Cleanup Goals for all eight chemicals listed in the table from the ROD (Table 23, Page 65) were reviewed against current resources readily available. The question, "Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?", from the five-year review guidance is used for this portion of the review. Based on this review it is recommended that no changes to the reviewed cleanup goals be made, as there have been no changes to the cleanup goals since the ROD was written. The Details for this review are provided in Attachment H.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics: No change is recommended at this time.

### **C. Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

No weather-related events have affected the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

### **Technical Assessment Summary:**

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD. However, a system optimization evaluation and plume migration/hydraulic control evaluation is recommended to further evaluate and adequately address, as necessary, the areas of concern as noted in this report. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

### **Section 8. Issues**

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Contaminant Concentrations in the vicinity of MW-7, MW-8, and MW-13.	No	Yes
Inadequate plume capture in the vicinity of MW-10A and MW-10B	No	Yes
Inadequate plume capture in the vicinity of MW-11A and MW-11B	No	Yes
Contaminant concentration in MW-4, MW-5, MW-6, MW-12, and EW-5	No	Yes

### **Section 9. Recommendations and Follow-Up Actions**

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
All of the issues identified in Section 8	System Optimization Evaluation and Action plan	Carolawn Steering Committee	EPA-4 and SCDHEC	May 30, 2004	No	Yes

#### **Section 10. Protectiveness Statement**

The remedy is protective of human health and the environment under current conditions. Current monitoring data indicate that the remedy is generally functioning as required to achieve groundwater cleanup goals. While, concentrations of most of the groundwater contaminants remain well above the remedial goals set forth in the ROD, the existing remedial system is expected to provide an adequate level of protection upon attainment of groundwater cleanup goals. At this time, there are no current residential well users on the Site or within the immediate vicinity of the Site (i.e., within the contaminated groundwater plume area). At this time, the Site is fenced with appropriate signs to restrict the access to the Site.

Long-term protectiveness of the remedial action will be verified by the proposed system optimization evaluation and continued monitoring of groundwater to fully evaluate potential migration of the contaminant plume downgradient from the treatment area and towards Fishing Creek. While the system is performing as designed, a system optimization evaluation including plume migration/hydraulic control evaluation and an Action Plan to address the issues stated in this report should be conducted to improve the overall effectiveness of the remedy and to expedite the cleanup at this Site.

#### **Section 11. Next Review**

The next five-year review for the Carolawn Superfund Site is required by August 2008, five years from the date of this review.

## **ATTACHMENT A**

### **Site Location Maps and Figures**

FIGURE 1



## SITE LOCATION MAP

CAROLAWN SUPERFUND SITE  
FORT LAWN, SOUTH CAROLINA

THIS MAP TAKEN FROM AAA  
NORTH CAROLINA/SOUTH CAROLINA



SCALE: 1:1,001,000

FILE No. 7229.001



CAROLAWN SITE  
FT. LAWN, SOUTH CAROLINA

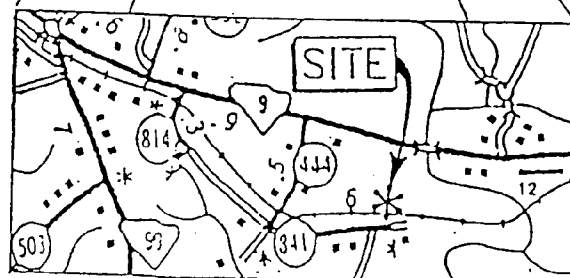
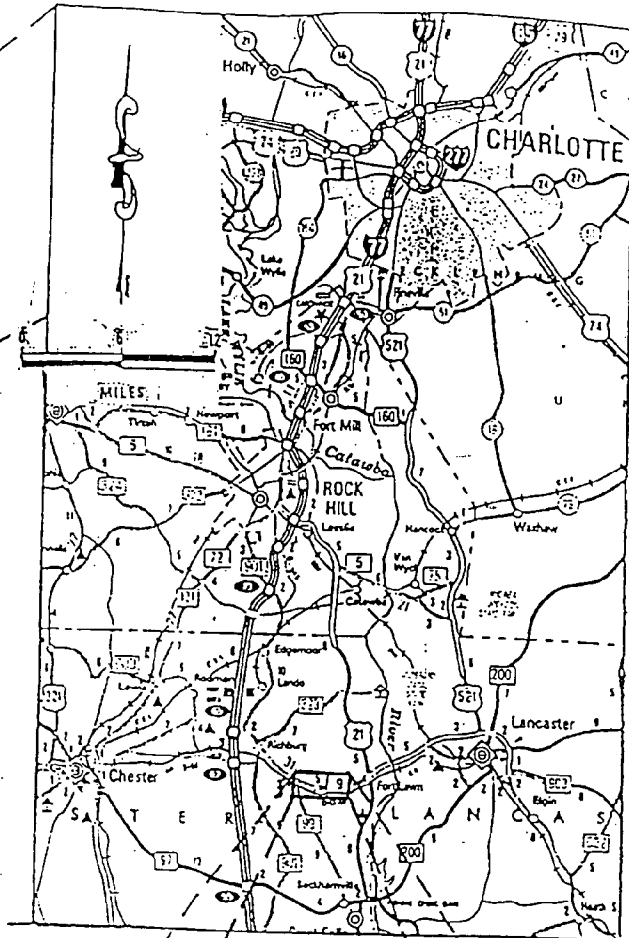
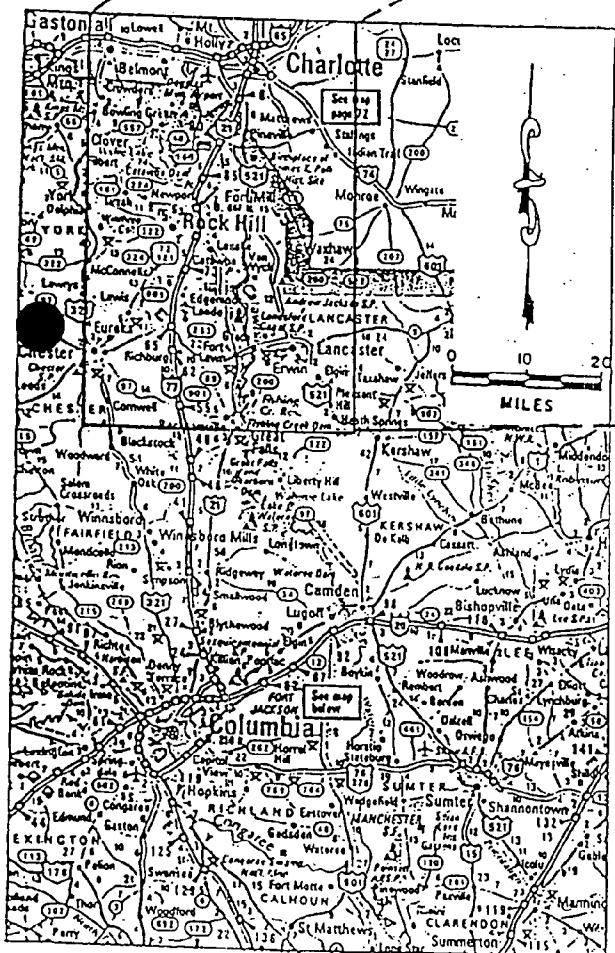


FIGURE 1. SITE LOCATION

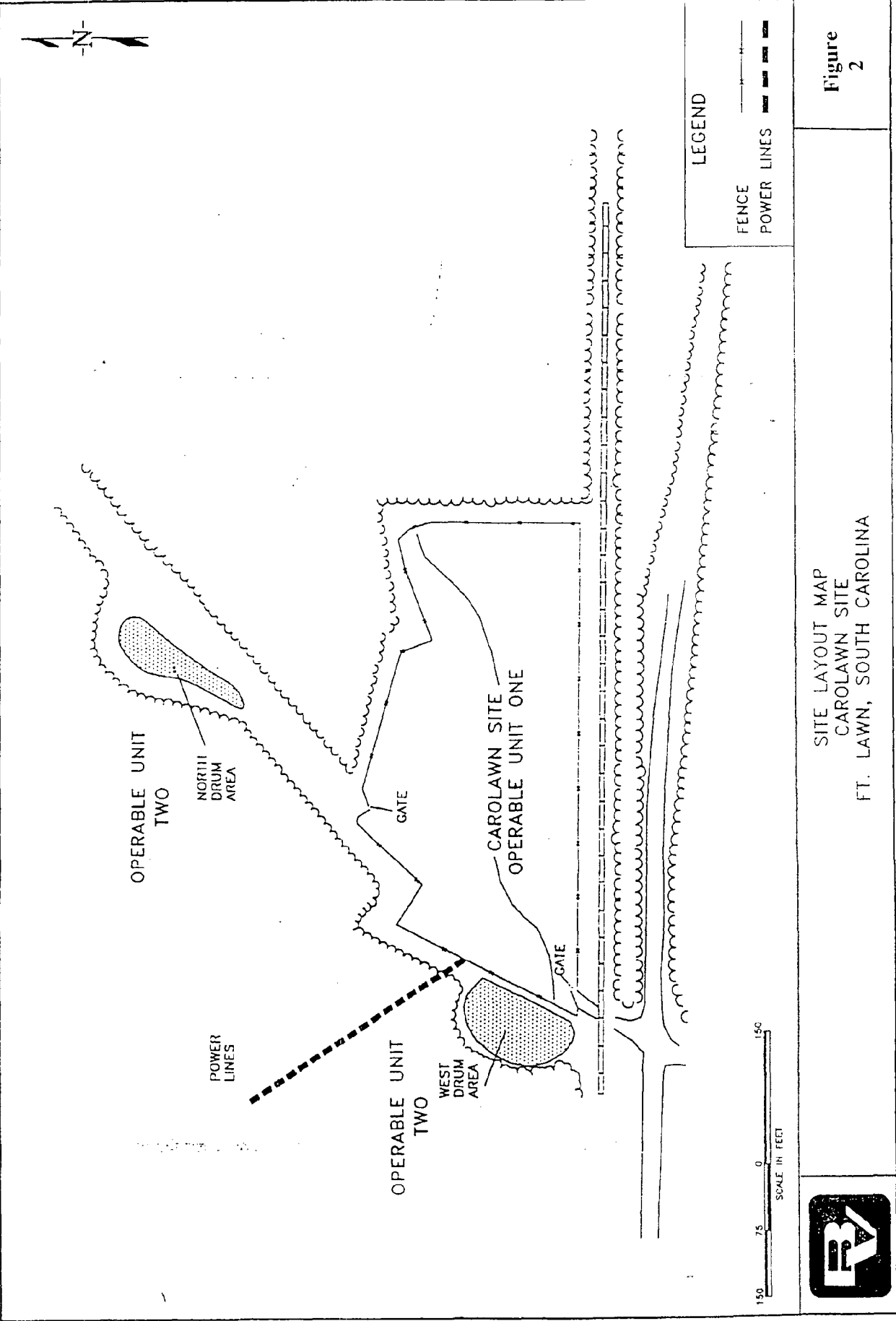
SOURCE: RAND McNALLY ROAD ATLAS, 1990., S.C. DEPT. OF  
HIGHWAYS & PUBLIC TRANSPORTATION. S.C. HWY. MAP



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**ATTACHMENT B**

**Remedial System Layout**



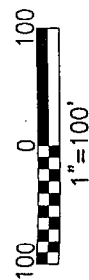
SITE LAYOUT MAP  
CAROLAWN SITE  
FT. LAWN, SOUTH CAROLINA

Figure  
2

### LEGEND



# MONITORING WELL & EXTRACTION WELL LOCATIONS



FILE NO. 21612.001  
MARCH 2000



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**ATTACHMENT C**

**List of Documents Reviewed**

## **List of Documents Reviewed**

1. Carolawn Steering Committee November 1998 – December 1999 Annual Report Volume 1 and 2, dated March 8, 2000.
2. Carolawn Steering Committee January – December 2000 Annual Report, dated March 16, 2001.
3. Carolawn Steering Committee January – December 2001 Annual Report, dated March 20, 2002.
4. Carolawn Steering Committee January – December 2002 Annual Report, dated March 7, 2003.
5. First Five-Year Review Report dated August 25, 1998.
6. Preliminary Close Out Report signed May 18, 1998.
7. EPA Superfund Record of Decision dated September 1989.
8. EPA Superfund Proposed Plan Fact Sheet dated July 1995.
9. EPA Comprehensive Five-Year Review Guidance dated June 2001.
10. ATSDR, 2002, Various ToxProfiles.
11. Iowa Department of Natural Resources, 1999, Table 1 – Statewide Standards for Groundwater, Iowa Land Recycling Program, 11 pp.
12. Minnesota Department of Health, 2003, Rule Revision - Health Risk Limits for Groundwater Rule, 3 pp.
13. Minnesota Department of Health, 1996, Health Risk Limits for Groundwater and Table of Health Risk Limits for Groundwater and Toxicologic Endpoints, 8 pp.
14. USEPA, 2003, IRIS, Various tables.
15. USEPA, 2003, List of Drinking Water Contaminants and MCLs, 10 pp.
16. USEPA, Summer 2002, 2002 Edition of the Drinking Water Standards and Health Advisories, EPA 822-R-02-038, Office of Water, USEPA, Washington, DC, 12 pp.
17. USEPA, June 2001, Comprehensive Five-Year Review Guidance –Appendix G, EPA 540-R-01-007, OSWER No. 9355.7-03B-P.

## **ATTACHMENT D**

### **Figures from Annual Reports – GW Flow Patterns**

FIGURE 3



**LEGEND**

- MW-10B**  
 388.55  
 MONITORING WELL WITH  
 WELL DESIGNATIONS  
 AND GROUND WATER  
 ELEVATION
- EW-2**  
 391.42  
 EXTRACTION WELL WITH  
 WELL DESIGNATIONS  
 AND GROUND WATER  
 ELEVATION
- FENCE
- PROPERTY LINE
- RAILROAD TRACKS
- GROUND WATER  
 POTENTIOMETRIC  
 CONTOUR (FT. MSL)-  
 5 FT. CONTOUR  
 INTERVAL

**CAROLAWN SUPERFUND SITE  
5093 MORRISON ROAD  
FORT LAWN, SOUTH CAROLINA**

**GROUND WATER  
CONTOUR PLAN  
DECEMBER 1998**



FILE NO. 21612.001  
JANUARY 1999

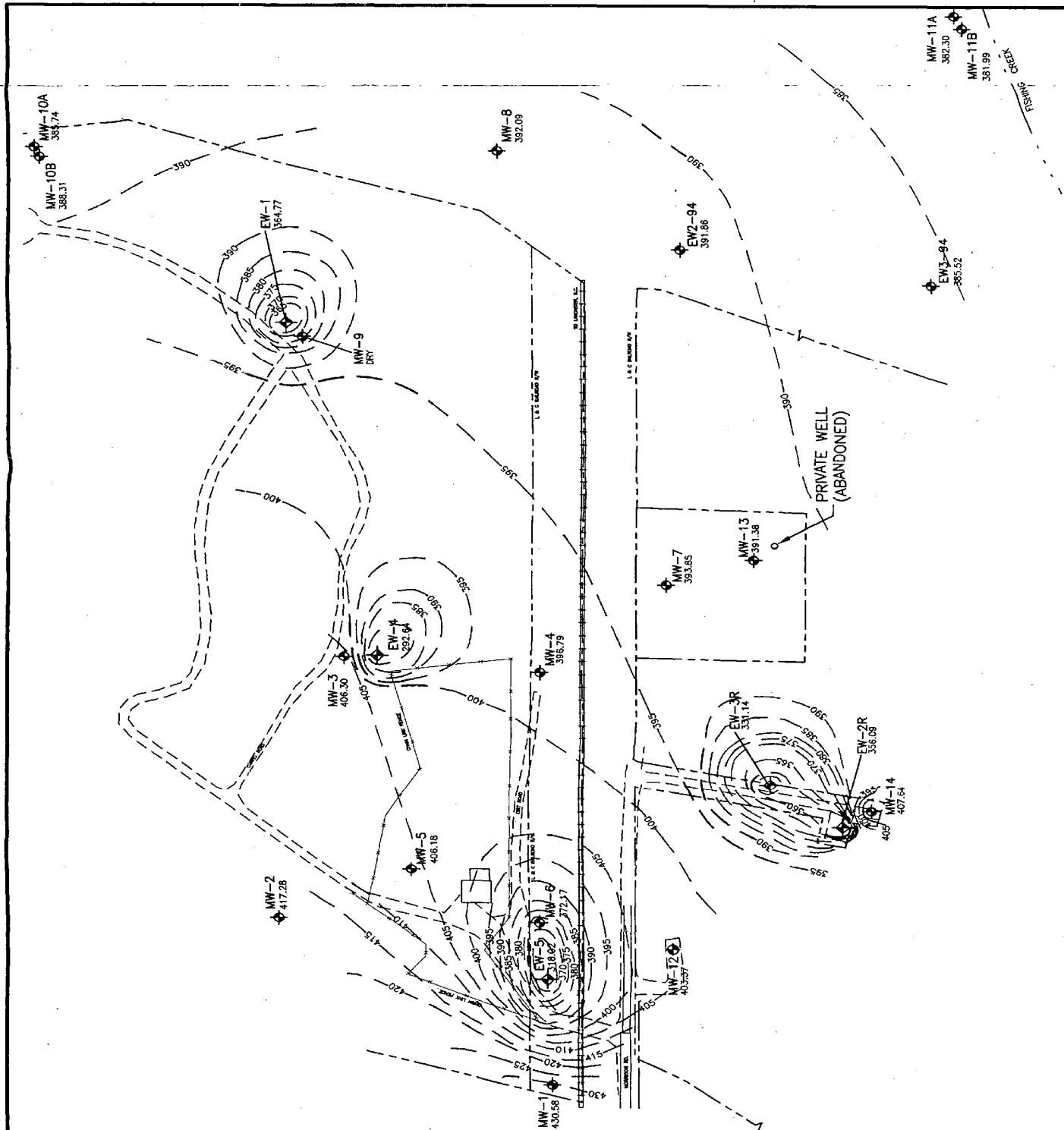
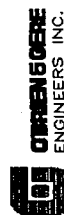


FIGURE 7

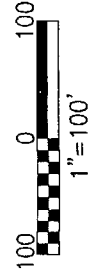


**LEGEND**

- MW-10B  
387.05  
MONITORING WELL WITH  
WELL DESIGNATION AND  
GROUND WATER  
ELEVATION
- EW-2  
393.48  
EXTRACTION WELL WITH  
WELL DESIGNATION AND  
GROUND WATER  
ELEVATION
- FENCE
- PROPERTY LINE
- RAILROAD TRACKS
- GROUND WATER  
POTENTIOMETRIC  
CONTOUR (FT. MSL)-  
5 FT. CONTOUR  
INTERVAL

**CAROLAWN SUPERFUND SITE  
5093 MORRISON ROAD  
FORT LAWN, SOUTH CAROLINA**

**GROUND WATER  
CONTOUR PLAN  
DECEMBER 1999**



FILE NO. 21612.001  
JANUARY 2000

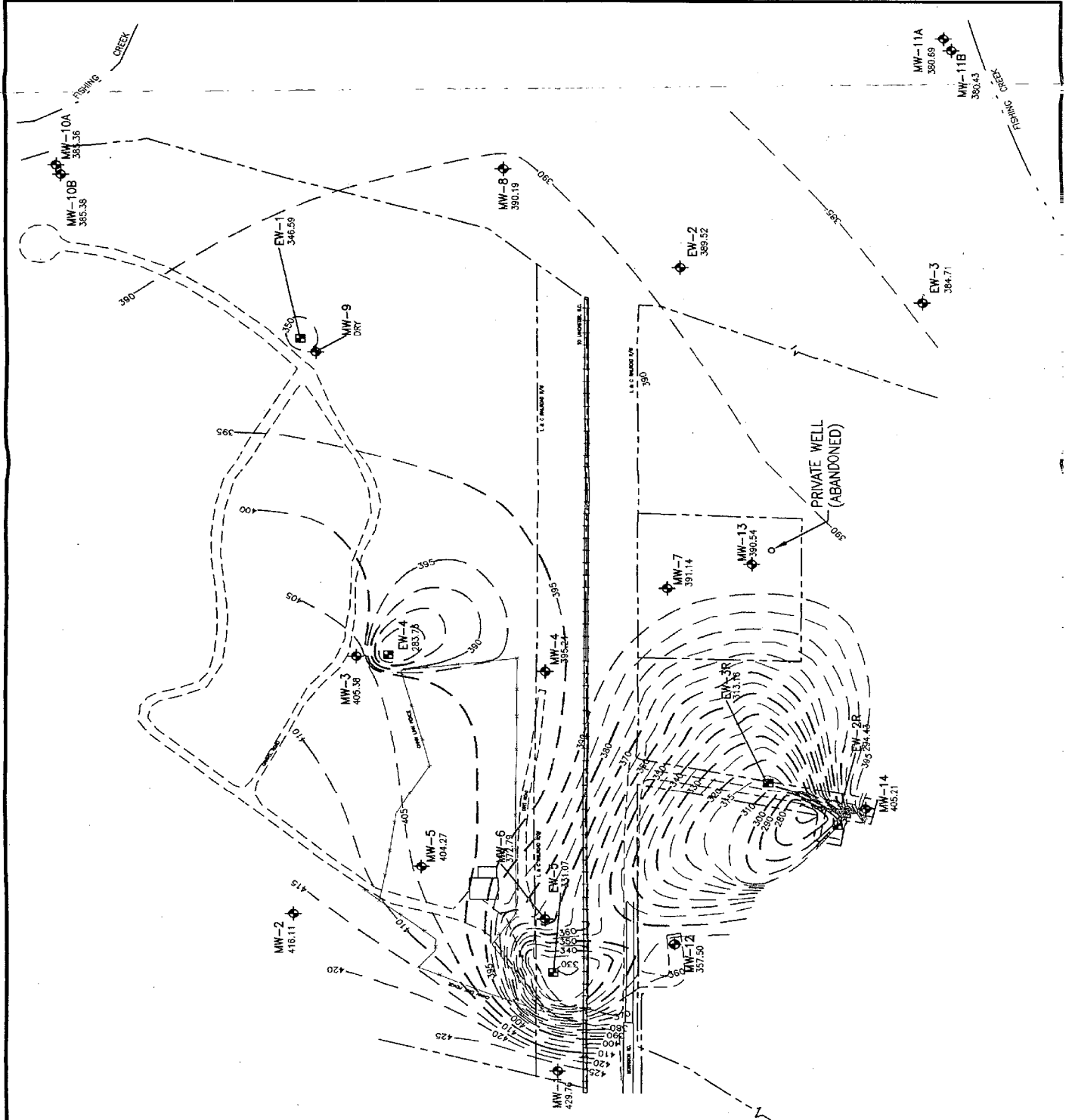




FIGURE 4

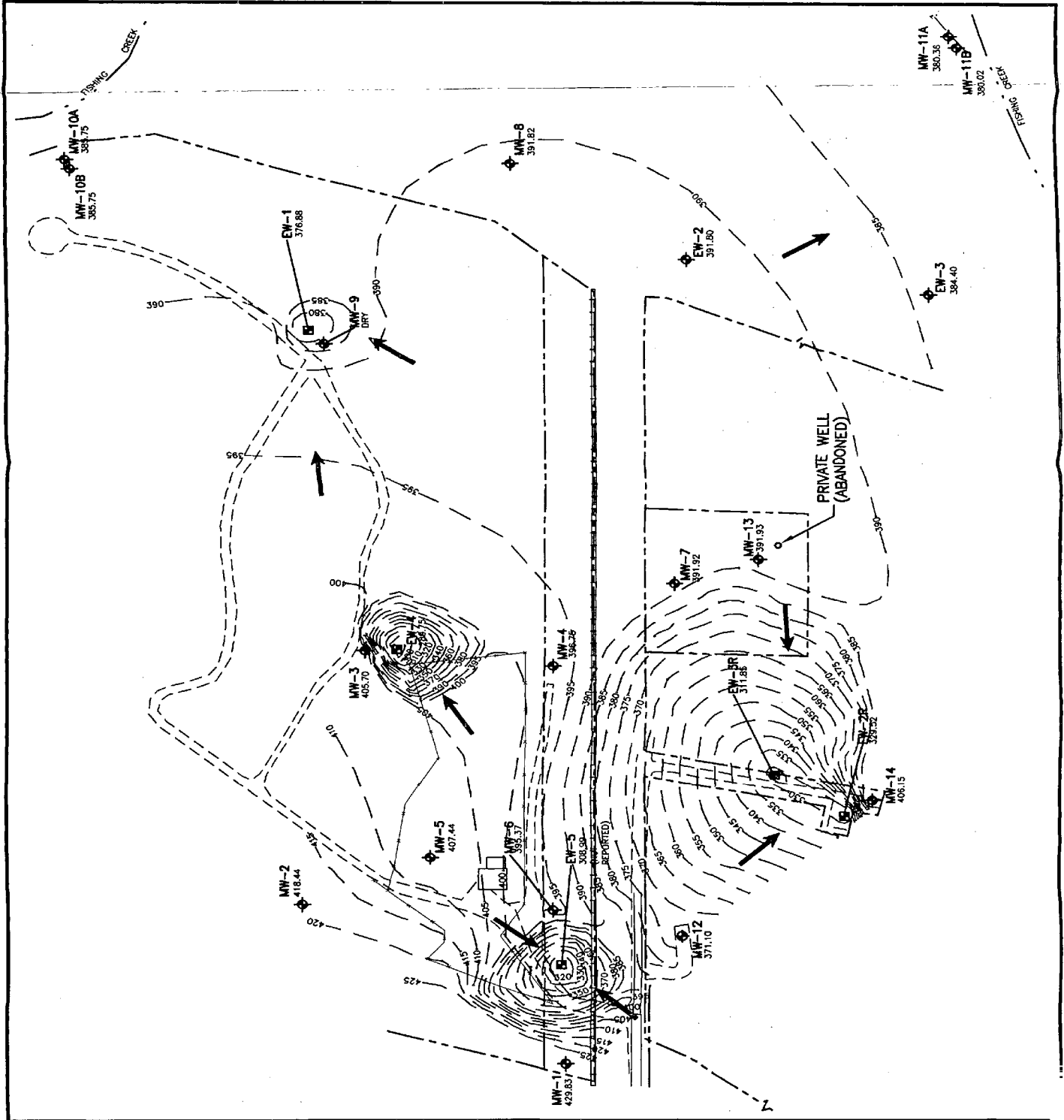


FIGURE 6

**LEGEND**

- ◆ MW-10B  
387.05  
MONITORING WELL WITH  
WELL DESIGNATION AND  
GROUND WATER  
ELEVATION
- EW-2  
393.48  
EXTRACTION WELL WITH  
WELL DESIGNATION AND  
GROUND WATER  
ELEVATION
- FENCE
- - - PROPERTY LINE
- == RAILROAD TRACKS
- GROUND WATER  
POTENTIOMETRIC  
SURFACE CONTOUR (FT.  
MSL)-5 FT. CONTOUR  
INTERVAL
- GROUND WATER  
FLOW  
DIRECTION

CAROLAWN SUPERFUND SITE  
5093 MORRISON ROAD  
FORT LAWN, SOUTH CAROLINA

**GROUND WATER  
CONTOUR PLAN  
DECEMBER 2000**



FILE NO. 21612.001-23  
MARCH 2001

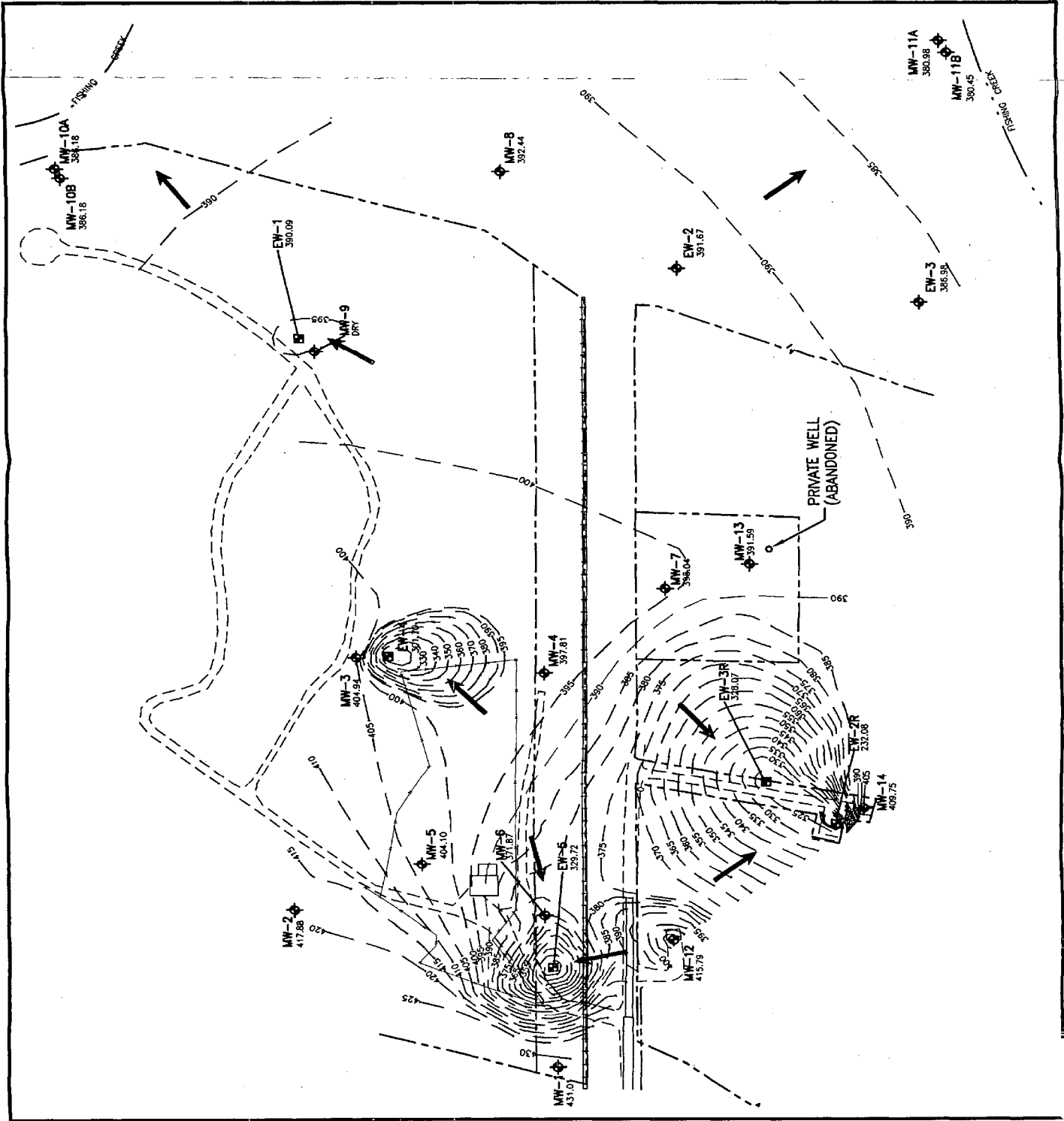










FIGURE 4

**LEGEND**

- 
**MW-10B**  
 MONITORING WELL WITH  
 WELL DESIGNATION AND  
 GROUND WATER  
 ELEVATION  
 397.05
- 
**EW-2R**  
 EXTRACTION WELL WITH  
 WELL DESIGNATION AND  
 GROUND WATER  
 ELEVATION  
 393.46
- 
 FENCE
- 
 PROPERTY LINE
- 
 RAILROAD TRACKS
- 
 GROUND WATER
- 
 POTENTIOMETRIC  
 SURFACE CONTOUR (FT.  
 MSL)-5 FT. CONTOUR  
 INTERVAL
- 
 INTERPRETED GROUND  
 WATER FLOW DIRECTION

**CAROLAWN SUPERFUND SITE**  
**5093 MORRISON ROAD**  
**FORT LAWN, SOUTH CAROLINA**

**GROUND WATER  
 CONTOUR PLAN  
 JUNE 2001**



FILE NO. 21612.001-25  
 MARCH 2002

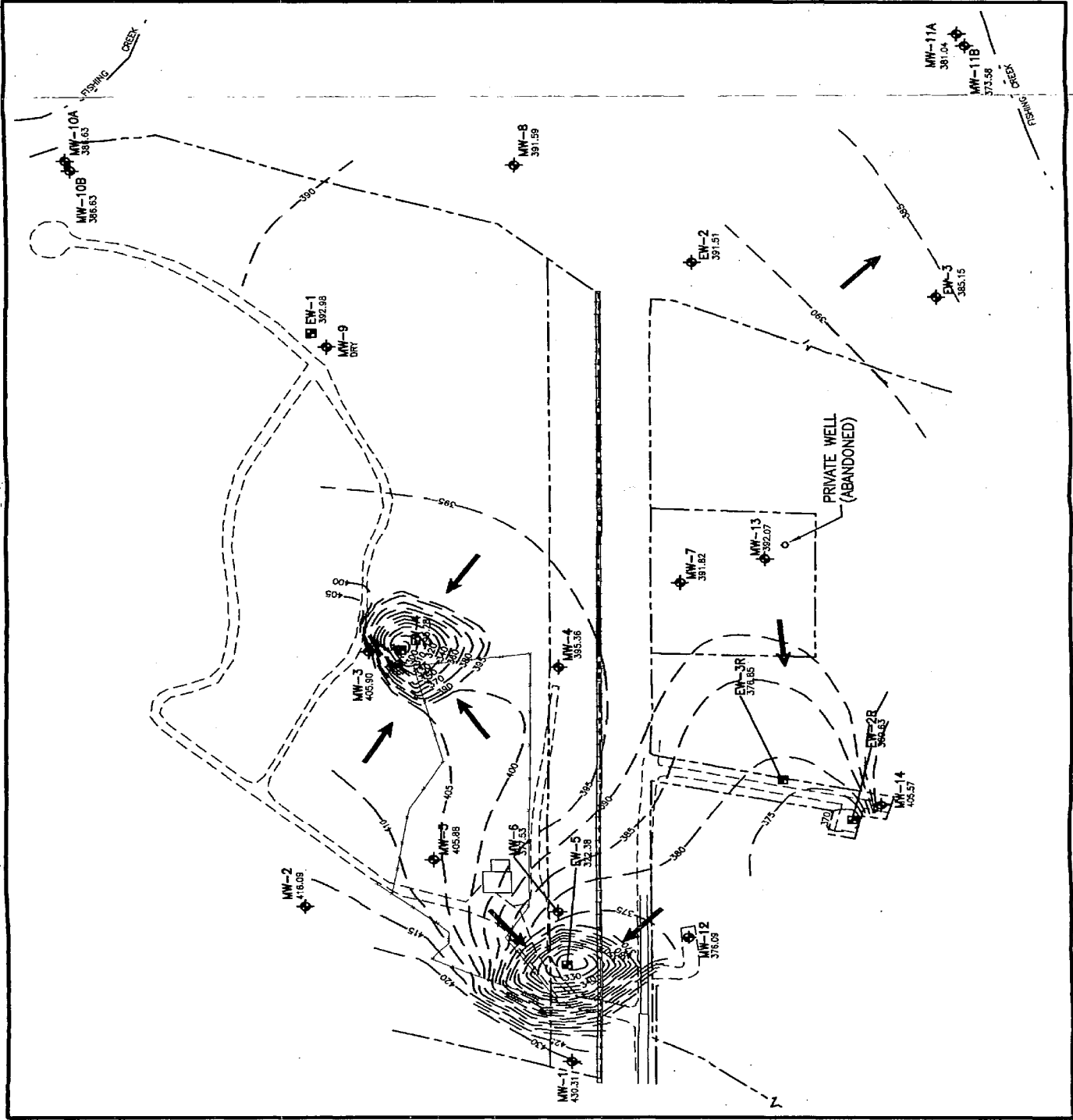
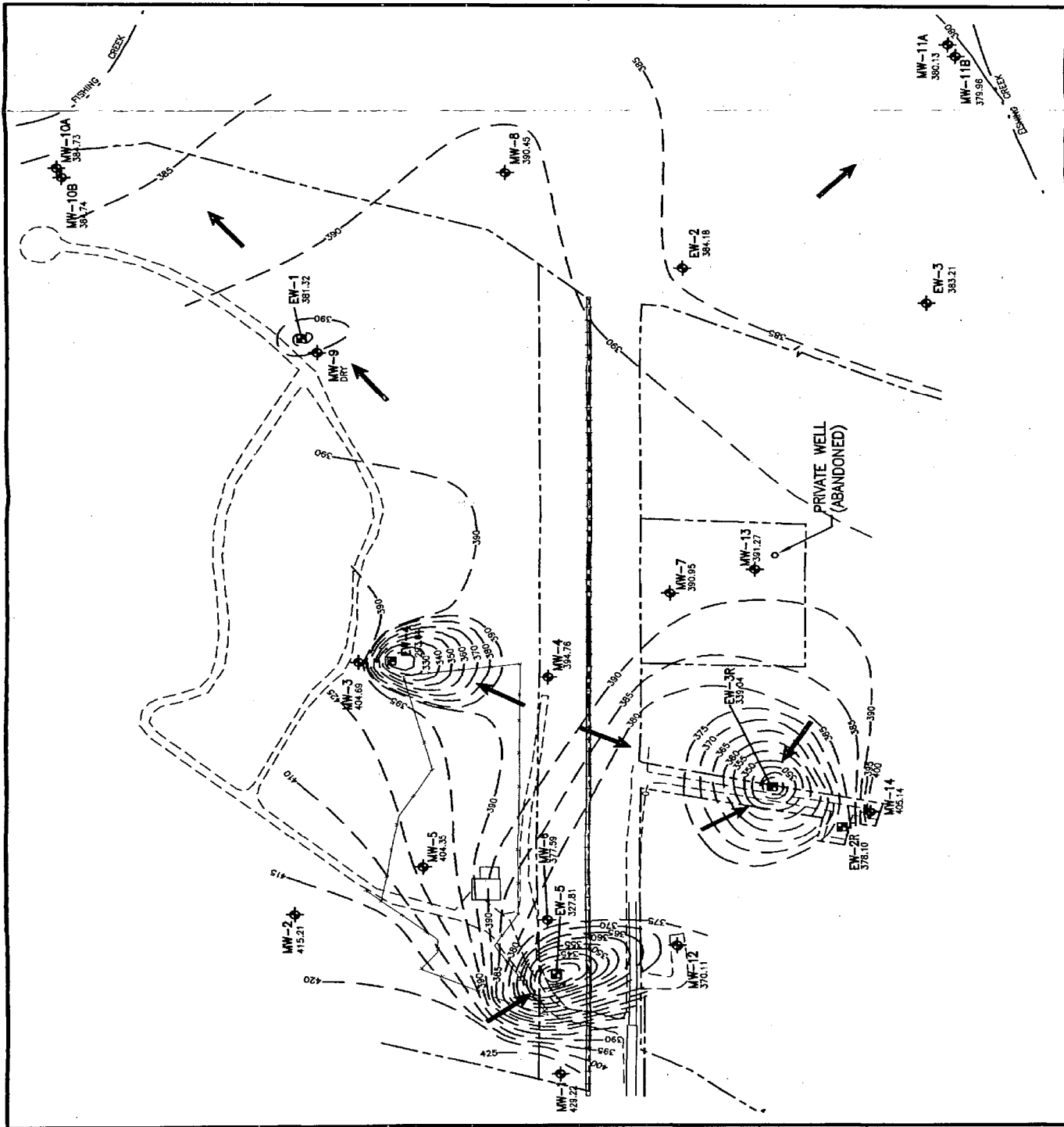


FIGURE 6



**LEGEND**

- MONITORING WELL WITH WELL DESIGNATION AND GROUND WATER ELEVATION
- EXTRACTION WELL WITH WELL DESIGNATION AND GROUND WATER ELEVATION
- FENCE
- PROPERTY LINE
- RAILROAD TRACKS
- GROUND WATER POTENTIOMETRIC SURFACE CONTOUR (FT. MSL)-5 FT. CONTOUR INTERVAL
- INTERPRETED GROUND WATER FLOW DIRECTION

CAROLAWN SUPERFUND SITE  
5093 MORRISON ROAD  
FORT LAWN, SOUTH CAROLINA

**GROUND WATER  
CONTOUR PLAN  
DECEMBER 2001**



FILE NO. 21612.001-27  
MARCH 2002



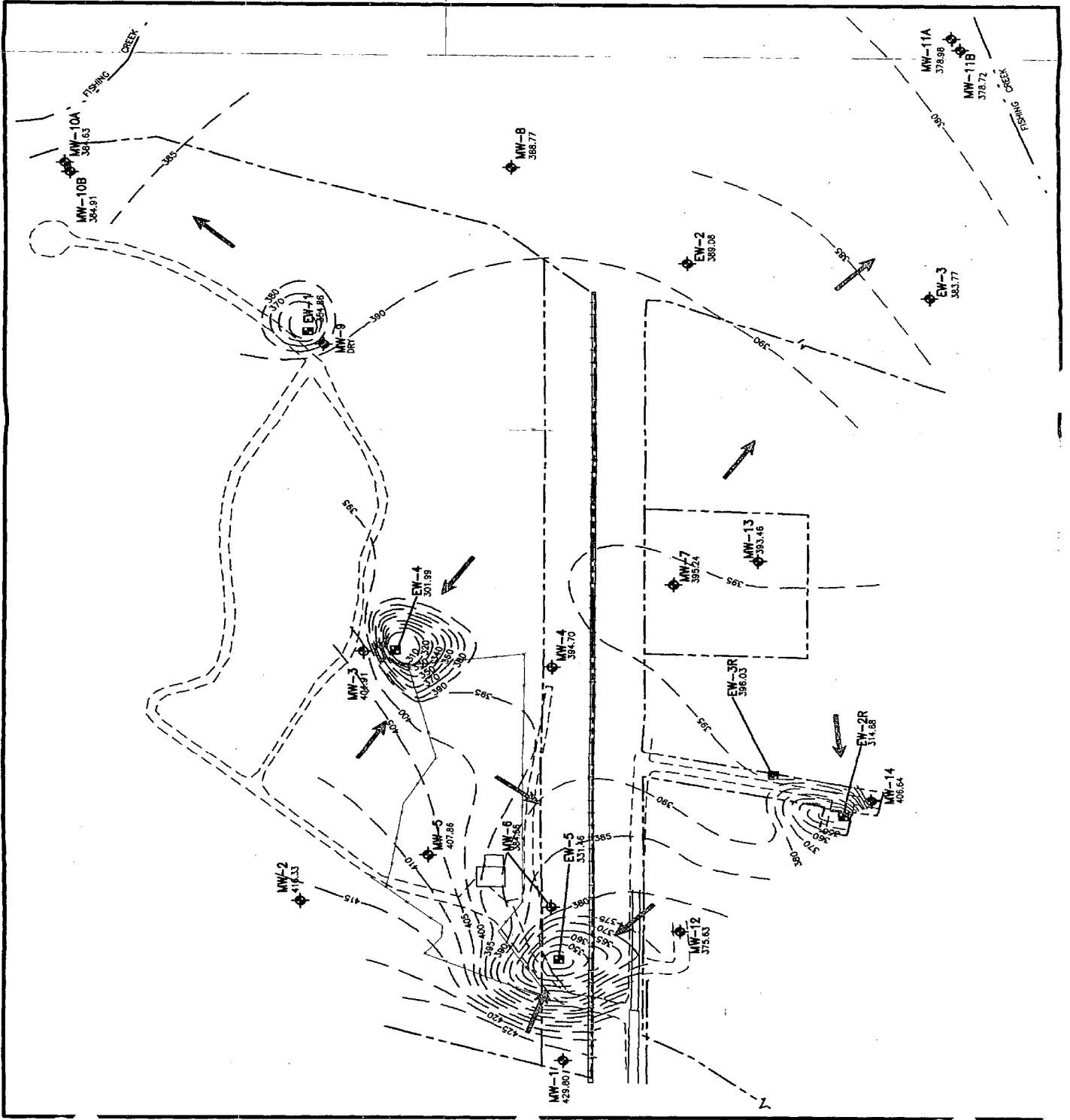
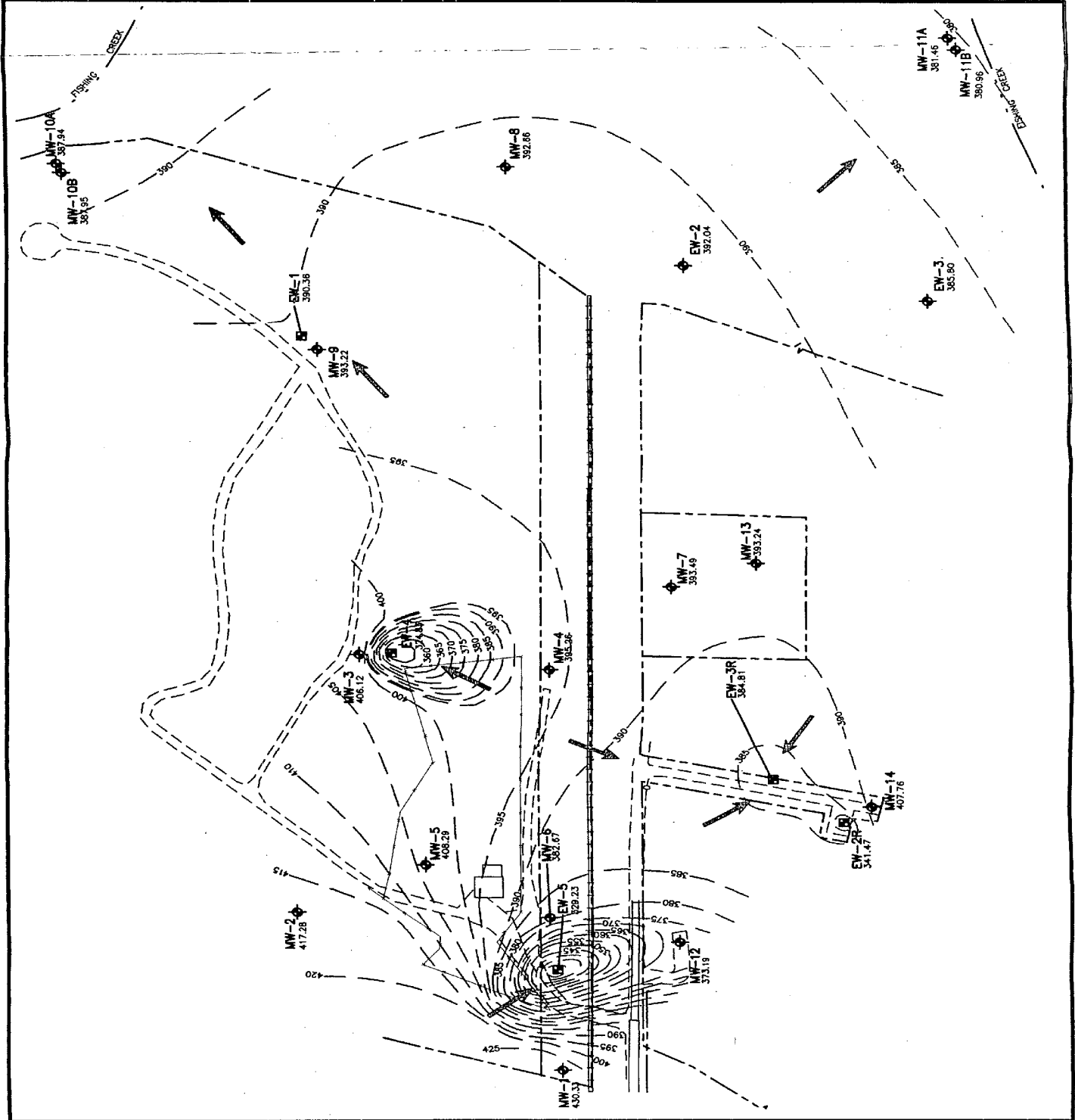


FIGURE 4

FIGURE 6



FILE NO. 21612.001-31  
MARCH 2003



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**ATTACHMENT E**

**Tables from 2002 Annual Report**

**Contaminant Trend  
And  
Extraction Well Volume Data**

**Carolawn Site  
Fort Lawn, South Carolina**

Table 6

**Monitoring Well Summary  
Contaminants of Concern Detected**

Monitoring Well	Sample Date	1,1-Dichloroethene (ug/L)	1,2-Dichloroethene (ug/L)	Trichloroethene (ug/L)
MW-1	Round 1 RI 1988	ND	ND	ND
	Round 2 RI 1988	ND	ND	ND
	Confirmatory Sampling 1/92	ND	ND	ND
	Confirmatory Sampling 2/92	ND	ND	ND
	Confirmatory Sampling 5/94	NA	4	9
	1st Quarter Sampling 10/96	ND	NA	NA
	2nd Quarter Sampling 3/97	ND	ND(T)	3.8
	3rd Quarter Sampling 6/97	ND	ND(T)	ND
	4th Quarter Sampling 9/97	ND	2	2
	Semi-annual sampling 3/98	ND	ND	ND
	Annual sampling 10/98	ND	ND	ND
	Supplemental sampling 1/99	NA	ND	ND
	Semi-annual sampling 3/99	ND	NA	NA
	Annual sampling 10/99	ND	ND	ND
	Semi-annual sampling 3/00	ND/ND	ND/ND	1.9/ND
	Annual sampling 10/00	ND	ND	ND
	Semi-annual sampling 3/01	ND	ND	ND
	Annual sampling 9/01	ND	ND	ND
	Semi-annual sampling 3/02	ND	ND	ND
	Annual sampling 9/02	ND	ND	0.19 (J)
MW-2	Round 1 RI 1988	ND	ND	ND
	Round 2 RI 1988	ND	ND	ND
	Confirmatory Sampling 1/92	ND	24	17
	Confirmatory Sampling 2/92	ND	7	8
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	ND	ND(T)	28
	2nd Quarter Sampling 3/97	ND	ND(T)	16
	3rd Quarter Sampling 6/97	ND	20	7
	4th Quarter Sampling 9/97	ND	74	19
	Semi-annual sampling 3/98	ND	ND	ND
	Annual sampling 10/98	ND	0.9(J)	0.2(J)
	Supplemental sampling 1/99	NA	NA	NA
	Semi-annual sampling 3/99	ND/ND	ND/ND	ND/ND
	Annual sampling 10/99	ND	2.3	ND
	Semi-annual sampling 3/00	ND/ND	4.4/6.5	ND/1.2
	Annual sampling 10/00	ND	2.1	ND
	Semi-annual sampling 3/01	ND	13	3.6
	Annual sampling 9/01	ND	8.2	1.9
	Semi-annual sampling 3/02	ND	3.8	1.8
	Annual sampling 9/02	0.22 (J)	13	7.5
MW-3	Round 1 RI 1988	ND	ND	440
	Round 2 RI 1988	77	ND	420
	Confirmatory Sampling 1/92	75	120	360
	Confirmatory Sampling 2/92	13	68	130
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	5	ND(T)	105
	2nd Quarter Sampling 3/97	10.5	ND(T)	75
	3rd Quarter Sampling 6/97	31	69	137
	4th Quarter Sampling 9/97	31	62	116
	Semi-annual sampling 3/98	41	59	129
	Annual sampling 10/98	28	53	150
	Supplemental sampling 1/99	NA	NA	NA
	Semi-annual sampling 3/99	26	62	150
	Annual sampling 10/99	25	62	120
	Semi-annual sampling 3/00	27	58	130
	Annual sampling 10/00	16/16	34/39	86/88
	Semi-annual sampling 3/01	23	47	110
	Annual sampling 9/01	15	100	100
	Semi-annual sampling 3/02	4.5 (J)	33	65
	Annual sampling 9/02	5.7 (J)	26	77

Notes: ND- Not Detected  
NA- Not Analyzed  
NI- Not Installed  
(T)- Trans-1,2-Dichloroethene only  
(J)- Estimated Value



**Carolawn Site  
Fort Lawn, South Carolina**

**Monitoring Well Summary  
Contaminants of Concern Detected**

Monitoring Well	Sample Date	1,1-Dichloroethene (ug/L)	1,2-Dichloroethene (ug/L)	Trichloroethene (ug/L)
MW-4	Round 1 RI 1988	ND	470	560
	Round 2 RI 1988	ND	280	230
	Confirmatory Sampling 1/92	ND	680	560
	Confirmatory Sampling 2/92	ND	640	650
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	ND	ND(T)	420
	2nd Quarter Sampling 3/97	ND	ND(T)	340
	3rd Quarter Sampling 6/97	14	498	330
	4th Quarter Sampling 9/97	11	469	296
	Semi-annual sampling 3/98	8	183	140
	Annual sampling 10/98	NA	NA	NA
	Supplemental sampling 1/99	6.4	143(J)	130
	Semi-annual sampling 3/99	ND	160	120
	Annual sampling 10/99	ND	130	73
	Semi-annual sampling 3/00	ND	140	89
	Annual sampling 10/00	ND	67	30
	Semi-annual sampling 3/01	12	140	87
	Annual sampling 9/01	3.2	55	25
	Semi-annual sampling 3/02	4.0	120	20
	Annual sampling 9/02	4.0 (J)	72.2 (J)	24
MW-5	Round 1 RI 1988	ND	ND	ND
	Round 2 RI 1988	16	230	180
	Confirmatory Sampling 1/92	6	250	130
	Confirmatory Sampling 2/92	12	270	220
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	ND	ND(T)	270
	2nd Quarter Sampling 3/97	ND	ND(T)	140
	3rd Quarter Sampling 6/97	5	225	167
	4th Quarter Sampling 9/97	6	200	150
	Semi-annual sampling 3/98	30	463	626
	Annual sampling 10/98	18	461	710
	Supplemental sampling 1/99	16	440	490
	Semi-annual sampling 3/99	ND	340	420
	Annual sampling 10/99	ND	220	160
	Semi-annual sampling 3/00	ND	510	480
	Annual sampling 10/00	21	370	450
	Semi-annual sampling 3/01	13/ND	340/330	350/320
	Annual sampling 9/01	16	240	290
	Semi-annual sampling 3/02	6.4 (J)	240	280
	Annual sampling 9/02	12 (J)	110	260
MW-6	Round 1 RI 1988	70	400	1200
	Round 2 RI 1988	170	450	880
	Confirmatory Sampling 1/92	110	1200	2500
	Confirmatory Sampling 2/92	74	840	1500
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	140	ND(T)	1600
	2nd Quarter Sampling 3/97	92	ND(T)	610
	3rd Quarter Sampling 6/97	142	778	1480
	4th Quarter Sampling 9/97	274	622	1780
	Semi-annual sampling 3/98	140	543	1320
	Annual sampling 10/98	230	610	2900
	Supplemental sampling 1/99	140	490	1400
	Semi-annual sampling 3/99	110	560	1500
	Annual sampling 10/99	160	570	1300
	Semi-annual sampling 3/00	ND	700	1300
	Annual sampling 10/00	82	380	1000
	Semi-annual sampling 3/01	110	470	1300
	Annual sampling 9/01	150/160	280/290	900/980
	Semi-annual sampling 3/02	130/140	200/220	1200/1200
	Annual sampling 9/02	140	180	1300

Notes: ND- Not Detected  
 NA- Not Analyzed  
 NI- Not Installed  
 (T)- Trans-1,2-Dichloroethene only  
 (J)-Estimated Value

**Carolawn Site  
Fort Lawn, South Carolina**

**Monitoring Well Summary  
Contaminants of Concern Detected**

Monitoring Well	Sample Date	1,1-Dichloroethene (ug/L)	1,2-Dichloroethene (ug/L)	Trichloroethene (ug/L)
MW-7	Round 1 RI 1988	ND	370	510
	Round 2 RI 1988	160	470	620
	Confirmatory Sampling 1/92	ND	590	830
	Confirmatory Sampling 2/92	ND	500	710
	Confirmatory Sampling 5/94	ND	570	430
	1st Quarter Sampling 10/96	ND	ND(T)	540
	2nd Quarter Sampling 3/97	ND	ND(T)	380
	3rd Quarter Sampling 6/97	5	476	328
	4th Quarter Sampling 9/97	5	471	315
	Semi-annual sampling 3/98	8	420	340
	Annual sampling 10/98	14(J)	490	490
	Supplemental sampling 1/99	8(J)	470	430
	Semi-annual sampling 3/99	ND	550	470
	Annual sampling 10/99	ND	530	370
	Semi-annual sampling 3/00	ND	520	410
	Annual sampling 10/00	21	450	410
	Semi-annual sampling 3/01	5.5(J)	547.5 (J)	360
	Annual sampling 9/01	ND	430	360
	Semi-annual sampling 3/02	2.3 (J)	340	230
	Annual sampling 9/02	4.2 (J)	266.3 (J)	270
MW-8	Round 1 RI 1988	ND	ND	ND
	Round 2 RI 1988	ND	ND	ND
	Confirmatory Sampling 1/92	ND	ND	ND
	Confirmatory Sampling 2/92	ND	ND	ND
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	ND	ND(T)	24
	2nd Quarter Sampling 3/97	NA	NA	NA
	3rd Quarter Sampling 6/97	4	7	17
	4th Quarter Sampling 9/97	3	6	12
	Semi-annual sampling 3/98	2	5	9
	Annual sampling 10/98	3	8.4(J)	29
	Supplemental sampling 1/99	NA	NA	NA
	Semi-annual sampling 3/99	1.5	3.8	8.7
	Annual sampling 10/99	ND	1.6	2.6
	Semi-annual sampling 3/00	6.1	9.2	31
	Annual sampling 10/00	ND	1.5	4.0
	Semi-annual sampling 3/01	ND	0.8 (J)	2.3
	Annual sampling 9/01	1.9	2.9	11.0
	Semi-annual sampling 3/02	0.25 (J)	0.77 (J)	2.2
	Annual sampling 9/02	4.8	4.6	28
MW-9	Round 1 RI 1988	ND	81	ND
	Round 2 RI 1988	ND	67	45
	Confirmatory Sampling 1/92	11	73	71
	Confirmatory Sampling 2/92	7	43	36
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	NA	NA	NA
	2nd Quarter Sampling 3/97	NA	NA	NA
	3rd Quarter Sampling 6/97	NA	NA	NA
	4th Quarter Sampling 9/97	NA	NA	NA
	Semi-annual sampling 3/98	NA	NA	NA
	Annual sampling 10/98	NA	NA	NA
	Supplemental sampling 1/99	NA	NA	NA
	Semi-annual sampling 3/99	NA	NA	NA
	Annual sampling 10/99	NA	NA	NA
	Semi-annual sampling 3/00	NA	NA	NA
	Annual sampling 10/00	NA	NA	NA
	Semi-annual sampling 3/01	NA	NA	NA
	Annual sampling 9/01	NA	NA	NA
	Semi-annual sampling 3/02	NA	NA	NA
	Annual sampling 9/02	NA	NA	NA

Notes: ND- Not Detected  
 NA- Not Analyzed  
 NI- Not Installed  
 (T)- Trans-1,2-Dichloroethene only  
 (J)-Estimated Value

Carolawn Site  
Fort Lawn, South Carolina

Table 6

Monitoring Well Summary  
Contaminants of Concern Detected

Monitoring Well	Sample Date	1,1-Dichloroethene (ug/L)	1,2-Dichloroethene (ug/L)	Trichloroethene (ug/L)
MW-10A	Round 1 RI 1988	ND	80	50
	Round 2 RI 1988	NA	NA	NA
	Confirmatory Sampling 1/92	17	130	82
	Confirmatory Sampling 2/92	17	140	90
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	15	ND(T)	100
	2nd Quarter Sampling 3/97	4.1	ND(T)	23
	3rd Quarter Sampling 6/97	16	119	110
	4th Quarter Sampling 9/97	18	90	78
	Semi-annual sampling 3/98	12	49	40
	Annual sampling 10/98	6	110	79
	Supplemental sampling 1/99	8.1	68	56
	Semi-annual sampling 3/99	11	79	70
	Annual sampling 10/99	15	130	100
	Semi-annual sampling 3/00	13	98	79
	Annual sampling 10/00	3.6	35	20
	Semi-annual sampling 3/01	10	94	64
	Annual sampling 9/01	11/10	98/88	80/81
	Semi-annual sampling 3/02	3.6 / 4.4	43 / 48	35 / 38
	Annual sampling 9/02	1.7	38.36 (J)	16
MW-10B	Round 1 RI 1988	14	110	64
	Round 2 RI 1988	ND	100	50
	Confirmatory Sampling 1/92	16	150	100
	Confirmatory Sampling 2/92	15	130	86
	Confirmatory Sampling 5/94	NA	NA	NA
	1st Quarter Sampling 10/96	11	ND(T)	120
	2nd Quarter Sampling 3/97	6.3	ND(T)	38
	3rd Quarter Sampling 6/97	12	114	90
	4th Quarter Sampling 9/97	17	116	88
	Semi-annual sampling 3/98	8	29	22
	Annual sampling 10/98	10	100	85
	Supplemental sampling 1/99	4.3	36.1(J)	26
	Semi-annual sampling 3/99	6.6	67	48
	Annual sampling 10/99	16	130	110
	Semi-annual sampling 3/00	16	120	98
	Annual sampling 10/00	2.8	20	19
	Semi-annual sampling 3/01	6.5	56	37
	Annual sampling 9/01	13	100	90
	Semi-annual sampling 3/02	3.7	37	31
	Annual sampling 9/02	6.4 (J) / 6.1 (J)	54.01 (J) / 52.80 (J)	69 / 64
MW-11A	Round 1 RI 1988	ND	ND	13
	Round 2 RI 1988	ND	ND	ND
	Confirmatory Sampling 1/92	ND	ND	ND
	Confirmatory Sampling 2/92	ND	ND	ND
	Confirmatory Sampling 5/94	ND	ND	9
	1st Quarter Sampling 10/96	1.8	ND(T)	14
	2nd Quarter Sampling 3/97	9.4	ND(T)	56
	3rd Quarter Sampling 6/97	4	15	23
	4th Quarter Sampling 9/97	2	5	6
	Semi-annual sampling 3/98	6	16	22
	Annual sampling 10/98	0.3(J)	1	2
	Supplemental sampling 1/99	0.5(J)	2.8	3.1
	Semi-annual sampling 3/99	0.8(J)	3.2	5.1
	Annual sampling 10/99	ND	ND	ND
	Semi-annual sampling 3/00	ND	ND	ND
	Annual sampling 10/00	ND	ND	ND
	Semi-annual sampling 3/01	1.5	6.3	7.6
	Annual sampling 9/01	ND	17	17
	Semi-annual sampling 3/02	0.4 (J)	2.2	3.1
	Annual sampling 9/02	1.5	10	14

Notes: ND- Not Detected  
NA- Not Analyzed  
NI- Not Installed  
(T)- Trans-1,2-Dichloroethene only  
(J)-Estimated Value

**Carolawn Site  
Fort Lawn, South Carolina**

**Monitoring Well Summary  
Contaminants of Concern Detected**

Monitoring Well	Sample Date	1,1-Dichloroethene (ug/L)	1,2-Dichloroethene (ug/L)	Trichloroethene (ug/L)
MW-11E	Round 1 RI 1988	ND	ND	ND
	Round 2 RI 1988	ND	ND	ND
	Confirmatory Sampling 1/92	ND	4	13
	Confirmatory Sampling 2/92	ND	4	12
	Confirmatory Sampling 5/94	ND	5	17
	1st Quarter Sampling 10/96	ND	ND(T)	31
	2nd Quarter Sampling 3/97	3.2	ND(T)	17
	3rd Quarter Sampling 6/97	ND	17	90
	4th Quarter Sampling 9/97	3	15	17
	Semi-annual sampling 3/98	4	14	19
	Annual sampling 10/98	ND	6	4
	Supplemental sampling 1/99	1.4	16	19
	Semi-annual sampling 3/99	ND	6.5	5
	Annual sampling 10/99	ND	4.1	ND
	Semi-annual sampling 3/00	ND	5.5	3.3
	Annual sampling 10/00	ND	3.9	ND
	Semi-annual sampling 3/01	5	25	33
	Annual sampling 9/01	2.1	16	22
	Semi-annual sampling 3/02	1.3 (J)	15	17
	Annual sampling 9/02	1.5 / 1.5	14 / 14	19 / 19
MW-12	Round 1 RI 1988	NI	NI	NI
	Round 2 RI 1988	NI	NI	NI
	Confirmatory Sampling 1/92	ND	81	1900
	Confirmatory Sampling 2/92	130	390	3700
	Confirmatory Sampling 5/94	30	570	730
	1st Quarter Sampling 10/96	ND	ND(T)	920
	2nd Quarter Sampling 3/97	43.5	ND(T)	725
	3rd Quarter Sampling 6/97	84	190	1860
	4th Quarter Sampling 9/97	210	270	3140
	Semi-annual sampling 3/98	78	123	1560
	Annual sampling 10/98	1	2	28
	Supplemental sampling 1/99	NA	NA	NA
	Semi-annual sampling 3/99	130	130	2000
	Annual sampling 10/99	86	110	510
	Semi-annual sampling 3/00	110	53	710
	Annual sampling 10/00	70	50	670
	Semi-annual sampling 3/01	120	55	750
	Annual sampling 9/01	110	44	750
	Semi-annual sampling 3/02	120	62	870
	Annual sampling 9/02	75	54	730
MW-13	Round 1 RI 1988	NI	NI	NI
	Round 2 RI 1988	NI	NI	NI
	Confirmatory Sampling 1/92	ND	380	650
	Confirmatory Sampling 2/92	7	430	630
	Confirmatory Sampling 5/94	ND	390	520
	1st Quarter Sampling 10/96	ND	ND(T)	250
	2nd Quarter Sampling 3/97	NA	NA	NA
	3rd Quarter Sampling 6/97	32	472	518
	4th Quarter Sampling 9/97	41	732	670
	Semi-annual sampling 3/98	30	333	390
	Annual sampling 10/98	21	510	600
	Supplemental sampling 1/99	24(J)	474	600
	Semi-annual sampling 3/99	ND	450	440
	Annual sampling 10/99	ND	480	430
	Semi-annual sampling 3/00	ND	400	420
	Annual sampling 10/00	ND	360	360
	Semi-annual sampling 3/01	37	570	580
	Annual sampling 9/01	46	580	700
	Semi-annual sampling 3/02	17	220	310
	Annual sampling 9/02	35	412.2 (J)	670

Notes: ND- Not Detected  
 NA- Not Analyzed  
 NI- Not Installed  
 (T)- Trans-1,2-Dichloroethene only  
 (J)-Estimated Value

**Carolawn Site  
Fort Lawn, South Carolina**

**Monitoring Well Summary  
Contaminants of Concern Detected**

Monitoring Well	Sample Date	1,1-Dichloroethene (ug/L)	1,2-Dichloroethene (ug/L)	Trichloroethene (ug/L)
MW-14	Round 1 RI 1988	NI	NI	NI
	Round 2 RI 1988	NI	NI	NI
	Confirmatory Sampling 1/92	NI	NI	NI
	Confirmatory Sampling 2/92	NI	NI	NI
	Confirmatory Sampling 5/94	ND	3	31
	1st Quarter Sampling 10/96	ND	ND(T)	12
	2nd Quarter Sampling 3/97	1.4	ND(T)	12
	3rd Quarter Sampling 6/97	2	3	15
	4th Quarter Sampling 9/97	2	2	21
	Semi-annual sampling 3/98	2	2	20
	Annual sampling 10/98	1	2	24
	Supplemental sampling 1/99	NA	NA	NA
	Semi-annual sampling 3/99	ND	1.7	24
	Annual sampling 10/99	ND	1.9	23
	Semi-annual sampling 3/00	ND	1.5	22
	Annual sampling 10/00	ND/ND	2.1/2.5	18/18
	Semi-annual sampling 3/01	0.57(J)/0.48(J)	1.4/1.4	14/15
	Annual sampling 9/01	ND	5.5	15
	Semi-annual sampling 3/02	0.72 (J)	4.4	14
	Annual sampling 9/02	0.52 (J)	6.01 (J)	14
EW-2	Round 1 RI 1988	NI	NI	NI
	Round 2 RI 1988	NI	NI	NI
	Confirmatory Sampling 1/92	NI	NI	NI
	Confirmatory Sampling 2/92	NI	NI	NI
	Confirmatory Sampling 5/94	NI	NI	NI
	1st Quarter Sampling 10/96	1.2	ND(T)	6.7
	2nd Quarter Sampling 3/97	4.8	ND(T)	19
	3rd Quarter Sampling 6/97	3	8	20
	4th Quarter Sampling 9/97	3	8	11
	Semi-annual sampling 3/98	7	10	21
	Annual sampling 10/98	6	13	28
	Supplemental sampling 1/99	7.2 / 6.8	17 / 15	28 / 27
	Semi-annual sampling 3/99	2.2 / 2.3	5.7 / 5.9	10 / 11
	Annual sampling 10/99	1.4 / 1.3	3.5 / 3.2	4.9 / 4.6
	Semi-annual sampling 3/00	2.2/2.5	5.0/5.6	7.5/8.2
	Annual sampling 10/00	1.4	2.9	3.8
	Semi-annual sampling 3/01	2.3	5.6	6.8
	Annual sampling 9/01	2.1	7.3	5.9
	Semi-annual sampling 3/02	1.5	4.4	6.2
	Annual sampling 9/02	3	9.7	13
EW-3	Round 1 RI 1988	NI	NI	NI
	Round 2 RI 1988	NI	NI	NI
	Confirmatory Sampling 1/92	NI	NI	NI
	Confirmatory Sampling 2/92	NI	NI	NI
	Confirmatory Sampling 5/94	NI	NI	NI
	1st Quarter Sampling 10/96	ND	ND(T)	ND
	2nd Quarter Sampling 3/97	ND	ND(T)	1.6
	3rd Quarter Sampling 6/97	ND	1	ND
	4th Quarter Sampling 9/97	4	8	21
	Semi-annual sampling 3/98	ND	ND	ND
	Annual sampling 10/98	10	21	39
	Supplemental sampling 1/99	ND	ND	ND
	Semi-annual sampling 3/99	ND	ND	0.85
	Annual sampling 10/99	ND	ND	ND
	Semi-annual sampling 3/00	ND	ND	ND
	Annual sampling 10/00	ND	ND	ND
	Semi-annual sampling 3/01	ND	ND	ND
	Annual sampling 9/01	ND	ND	ND
	Semi-annual sampling 3/02	ND	ND	ND
	Annual sampling 9/02	ND	ND	ND

Notes: ND- Not Detected  
 NA- Not Analyzed  
 NI- Not Installed  
 (T)- Trans-1,2-Dichloroethene only  
 (J)-Estimated Value

**Carolawn Site  
Fort Lawn, South Carolina**

**Extraction Well Summary  
Contaminants of Concern Detected**

Extraction Well	Sample Date	1,1-Dichloroethene (ug/L)	1,2-Dichloroethene (ug/L)	Trichloroethene (ug/L)
EW-1	June 14, 1996	46	240	300
	June 17, 1996	43	240	250
	June 19, 1996	36	250	250
	June 21, 1996	39	290	250
	June 28, 1996	19	190	180
	October 11, 1996	41	ND(T)	350
	September 23, 1997	30	200	235
	October 6, 1998	15	100	150
	January 21, 1999	17	100	150
	September 27, 1999	30	180	250
	March 1, 2001	15	94(J)	150
	September 18, 2001	20	130	240
	March 7, 2002	14	94	150
	September 26, 2002	0.82 (J)	62.2	150
EW-2R	June 14, 1996	110	140	900
	June 17, 1996	94	120	720
	June 19, 1996	67	77	520
	June 21, 1996	55	76	420
	June 28, 1996	19	43	220
	October 11, 1996	120	ND(T)	500
	September 23, 1997	15	14	93
	October 6, 1998	ND(5)	6	81
	January 21, 1999	5(J)	6.1	67
	September 27, 1999	3	4.2	44
	March 1, 2001	4.4(J)	4.1(J)	77
	September 19, 2001	ND	6.6	110
	March 7, 2002	4.6 (J)	7.4	96
	September 26, 2002	7.6	18	140
EW-3R	June 14, 1996	240	260	1300
	June 17, 1996	200	230	1100
	June 19, 1996	170	210	900
	June 21, 1996	99 / 120	210 / 210	900 / 800
	June 28, 1996	120	190	740
	October 11, 1996	83	ND(T)	860
	September 23, 1997	43.1	188	416
	October 6, 1998	47	170	570
	January 21, 1999	61	160	530
	September 27, 1999	65	170	450
	March 1, 2001	33	120	350
	September 19, 2001	10	49	120
	March 7, 2002	17	84	290
	September 26, 2002	12 (J)	151.1 (J)	350

Notes: ND- Not Detected  
(T)- Trans-1,2-Dichloroethene only  
(J)-Estimated Value

Carolawn Site  
Fort Lawn, South Carolina

Extraction Well Summary  
Contaminants of Concern Detected

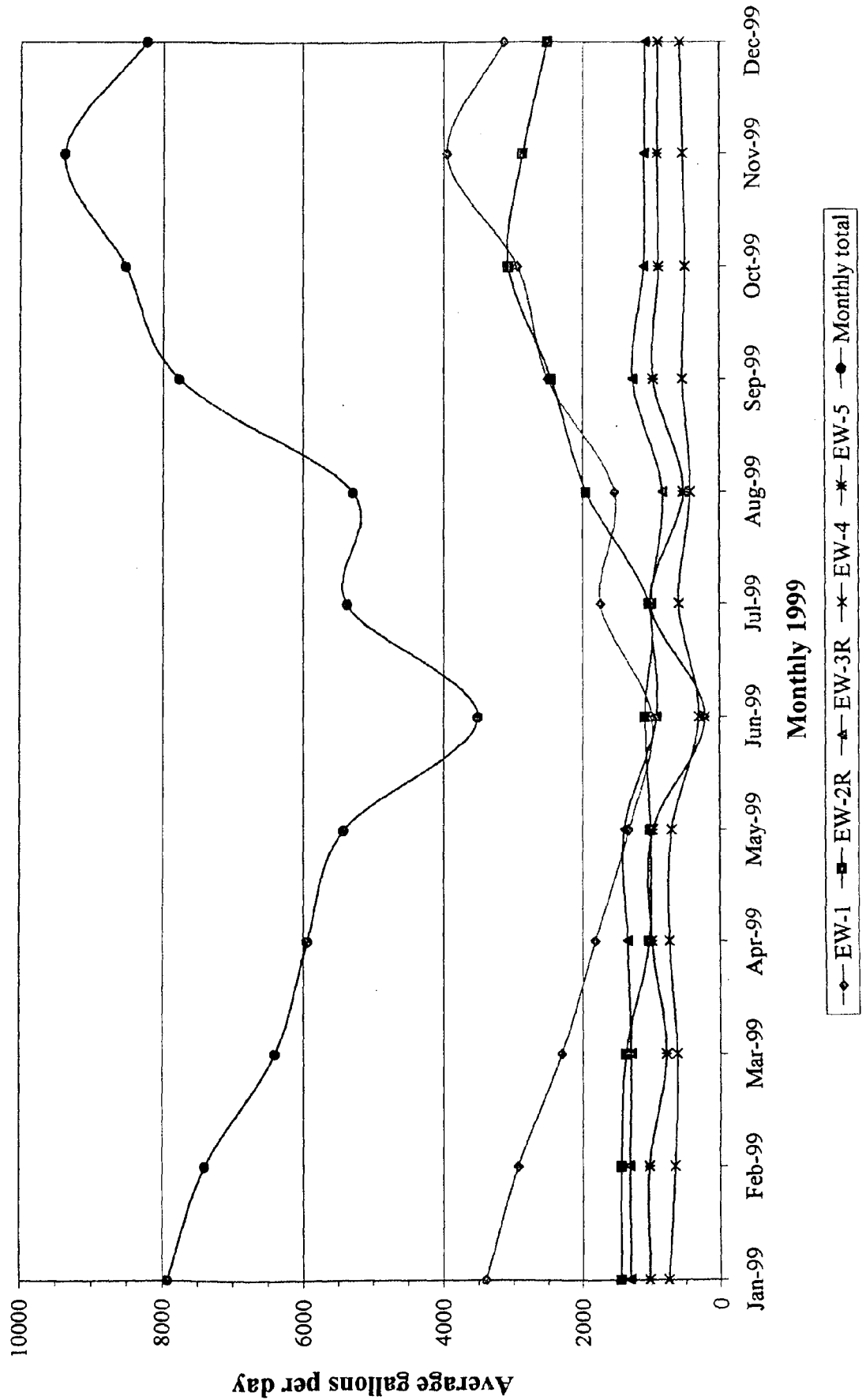
Extraction Well	Sample Date	1,1-Dichloroethene (ug/L)	1,2-Dichloroethene (ug/L)	Trichloroethene (ug/L)
EW-4	June 14, 1996	27	66	120
	June 17, 1996	26	50	140
	June 19, 1996	26	63	140
	June 21, 1996	19	64	140
	June 28, 1996	19	190	180
	October 11, 1996	19	ND(T)	150
	September 23, 1997	15	65	116
	October 6, 1998	15	53	110
	January 21, 1999	12	50	100
	September 27, 1999	16	86	130
	March 1, 2001	ND	44	66
	September 18, 2001	7.2	69	120
	March 7, 2002	8.2	47	95
	September 26, 2002	3.5 (J)	33.9 (J)	94
EW-5	June 14, 1996	ND(25)	270	530
	June 17, 1996	ND(50)	290	930
	June 19, 1996	31	280	710
	June 21, 1996	30	270	830
	June 28, 1996	16	290	770
	October 11, 1996	ND	ND(T)	690
	September 23, 1997	55	565	860
	October 6, 1998	ND(37)	550	910
	January 21, 1999	38	450	780
	September 27, 1999	ND(65)	560	820
	March 1, 2001	43	550	890
	September 19, 2001	ND	480	970
	March 7, 2002	81	400	1000
	September 26, 2002	51 (J)	270	830

Notes: ND- Not Detected  
(T)- Trans-1,2-Dichloroethene only

# Extraction Well Volume Removed 1999

Average gallons per day for each month

Carolawn NPL Site



2/7/2003

O'Brien & Gere Engineers, Inc.

FIGURE 8A



# Extraction Well Volume Removed 2000

Average gallons per day for each month

Carolawn NPL Site

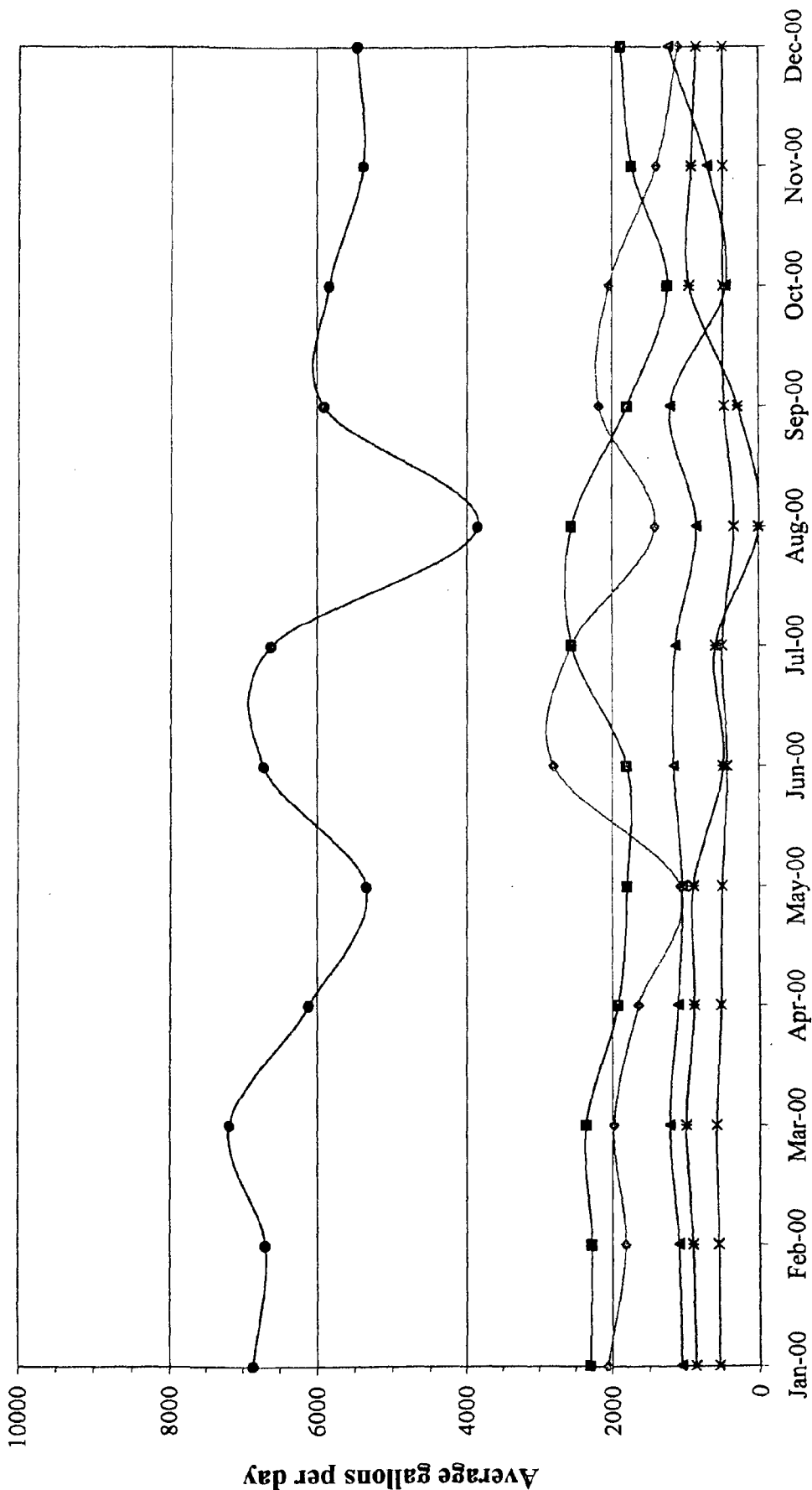


FIGURE 8B

Monthly 2000

—●— EW-1 —■— EW-2R —▲— EW-3R —×— EW-4 —\*— EW-5 —●— Monthly total

# Extraction Well Volume Removed 2001

Average gallons per day for each month  
Carolawn NPL Site

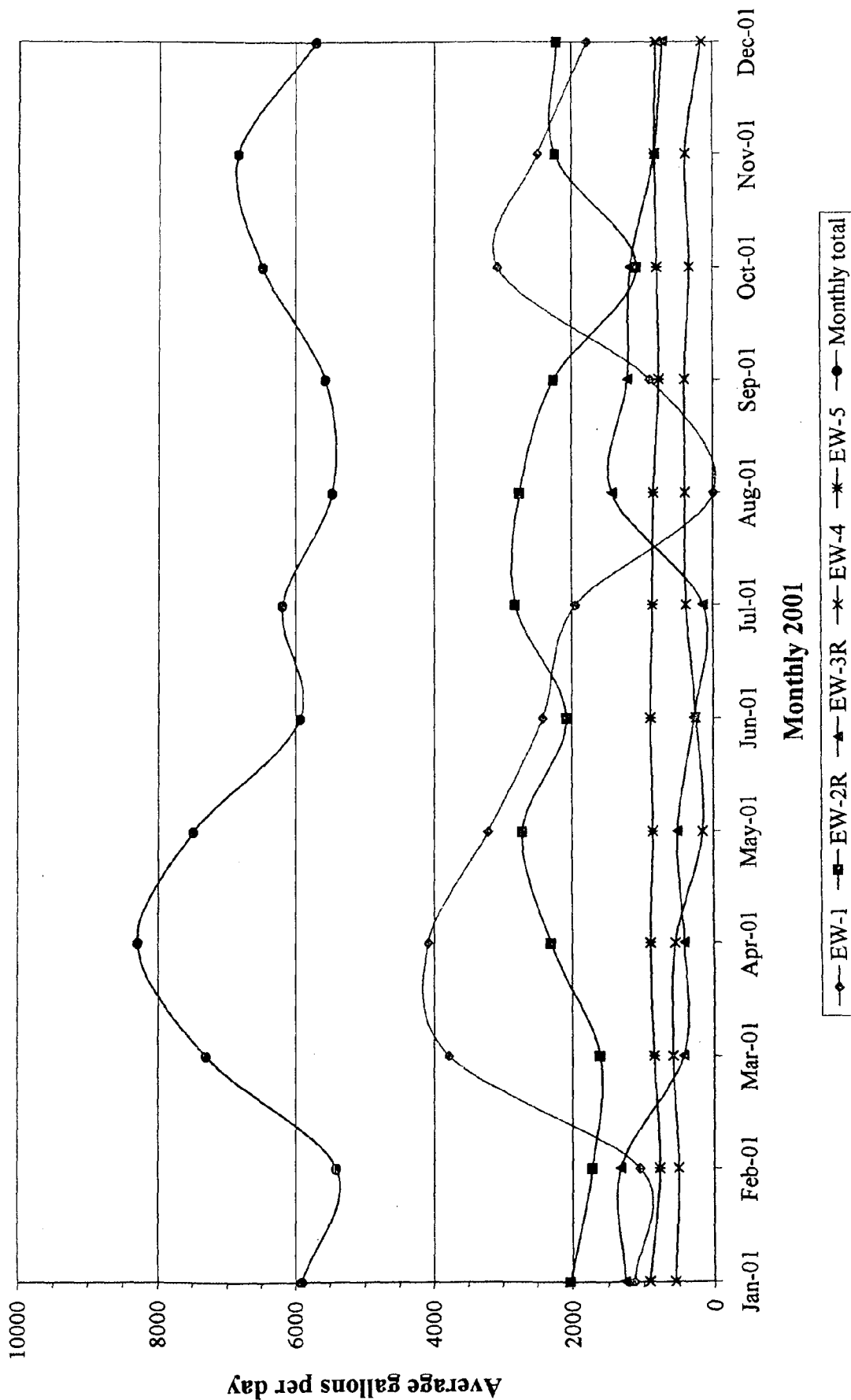
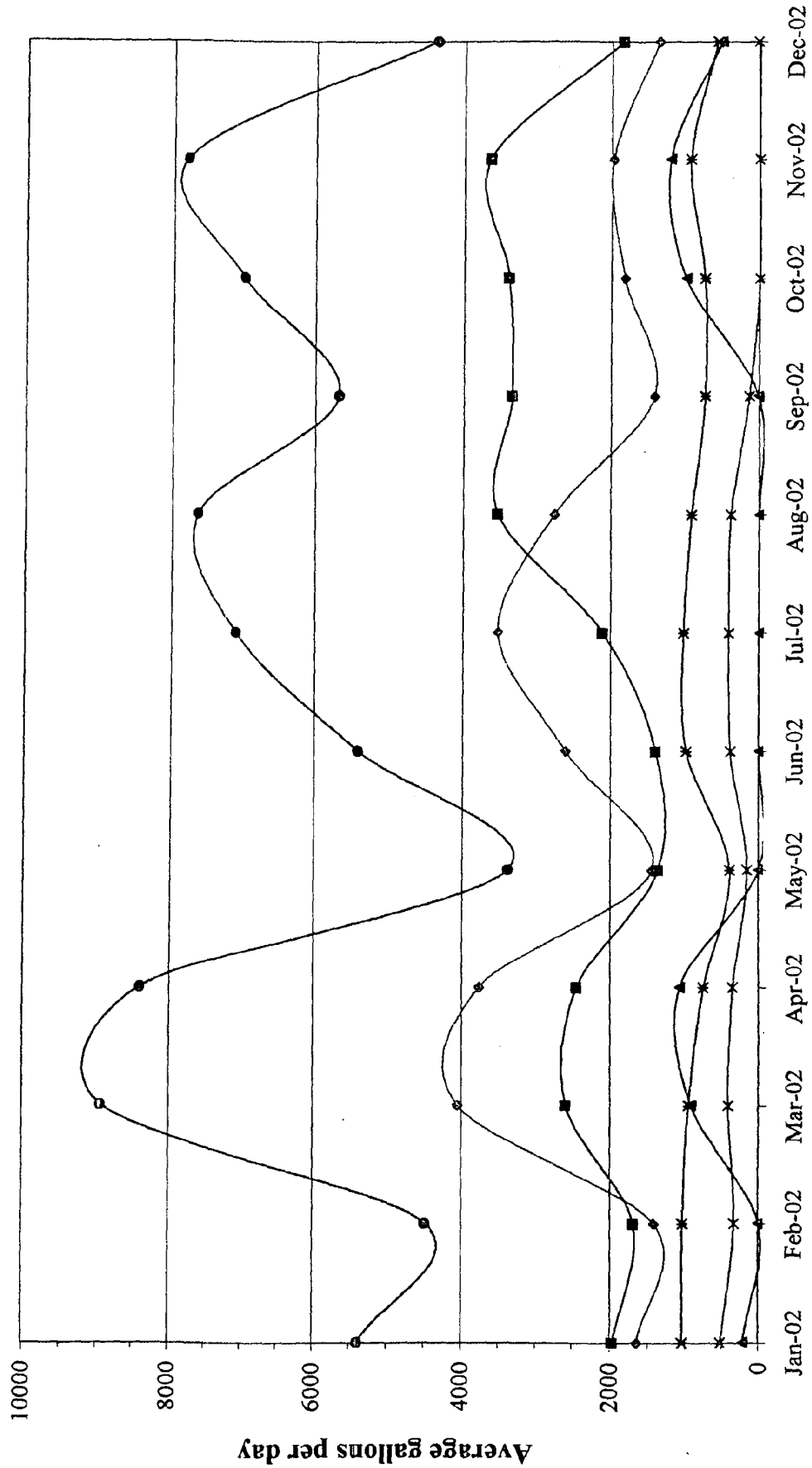


FIGURE 8C

# Extraction Well Volume Removed 2002

Average gallons per day for each month

Carolawn NPL Site



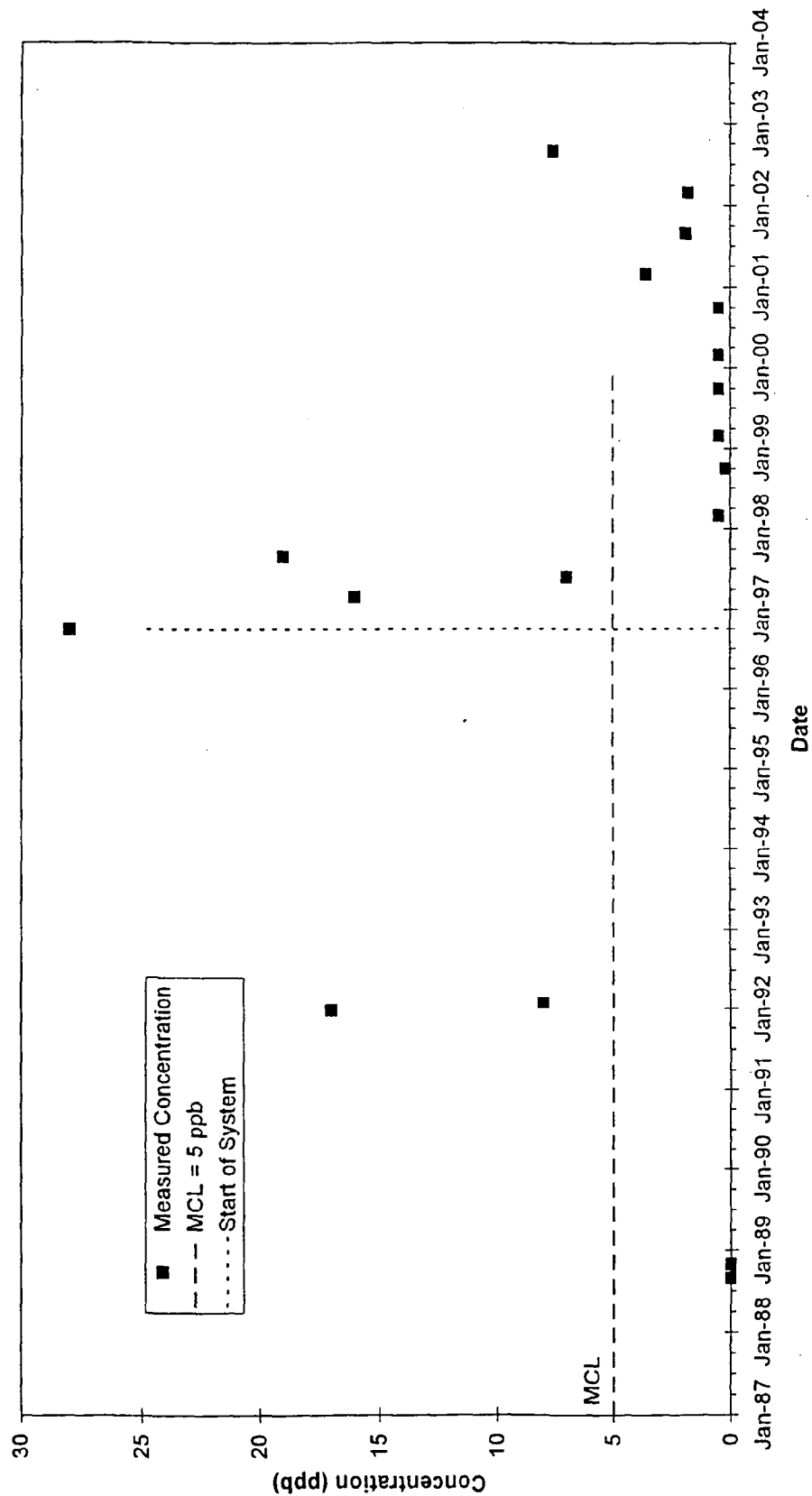
Monthly 2002

—●— EW-1 —■— EW-2R —▲— EW-3R —×— EW-4 —\*— EW-5 —●— Monthly total

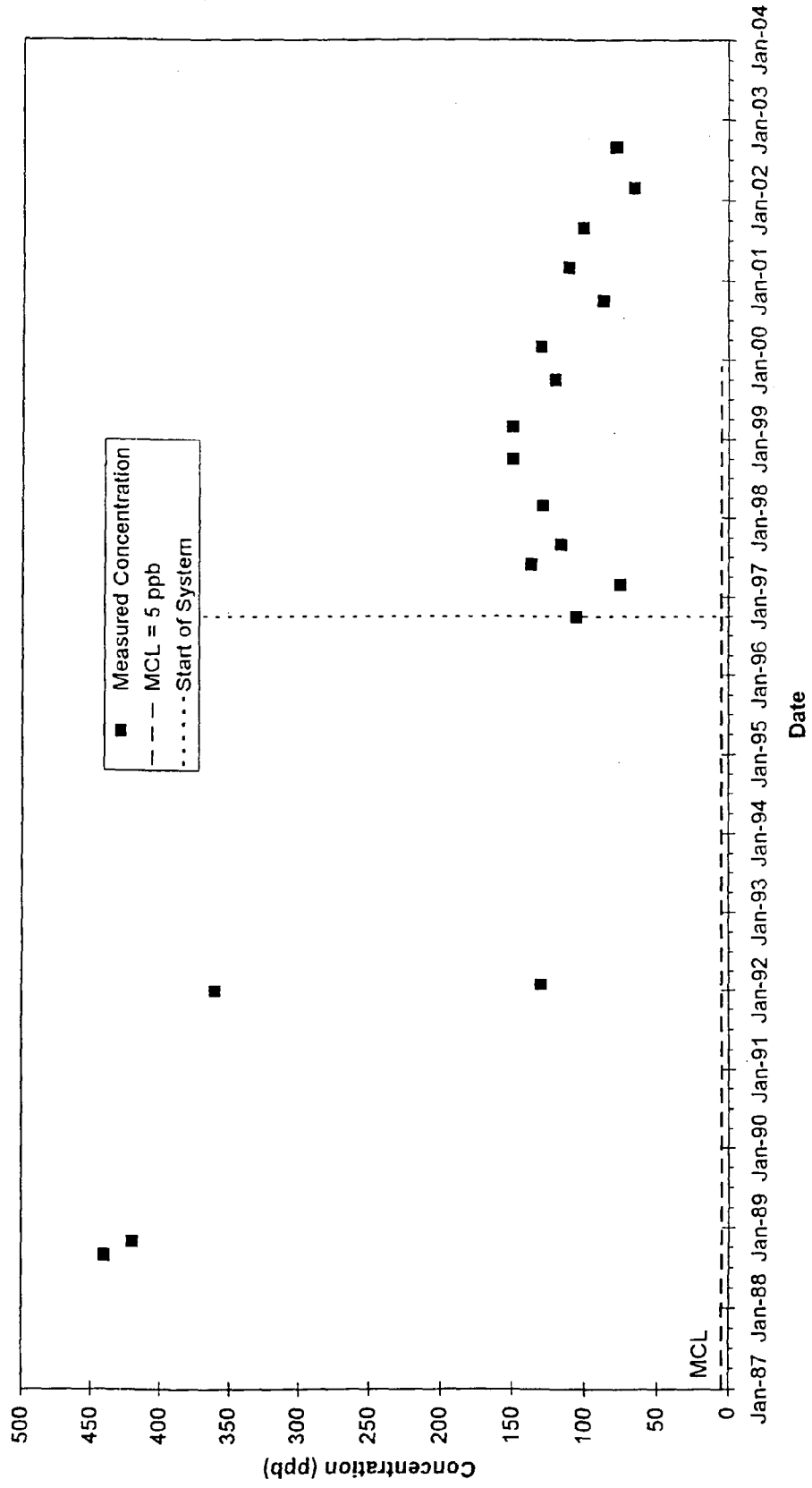
## **ATTACHMENT F**

**Figures from 2002 Annual Report – Contaminant Trend**

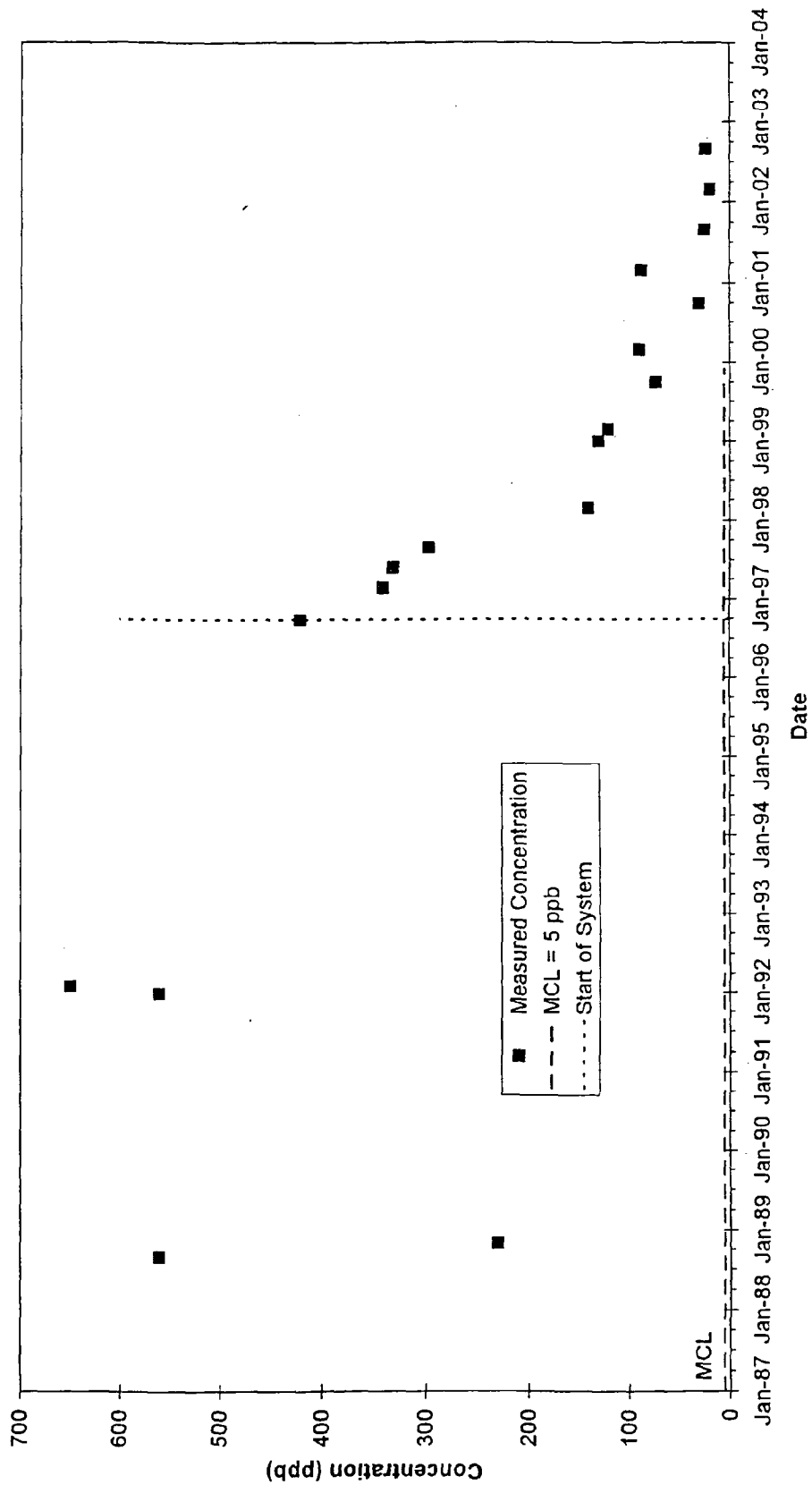
MW-2  
TCE



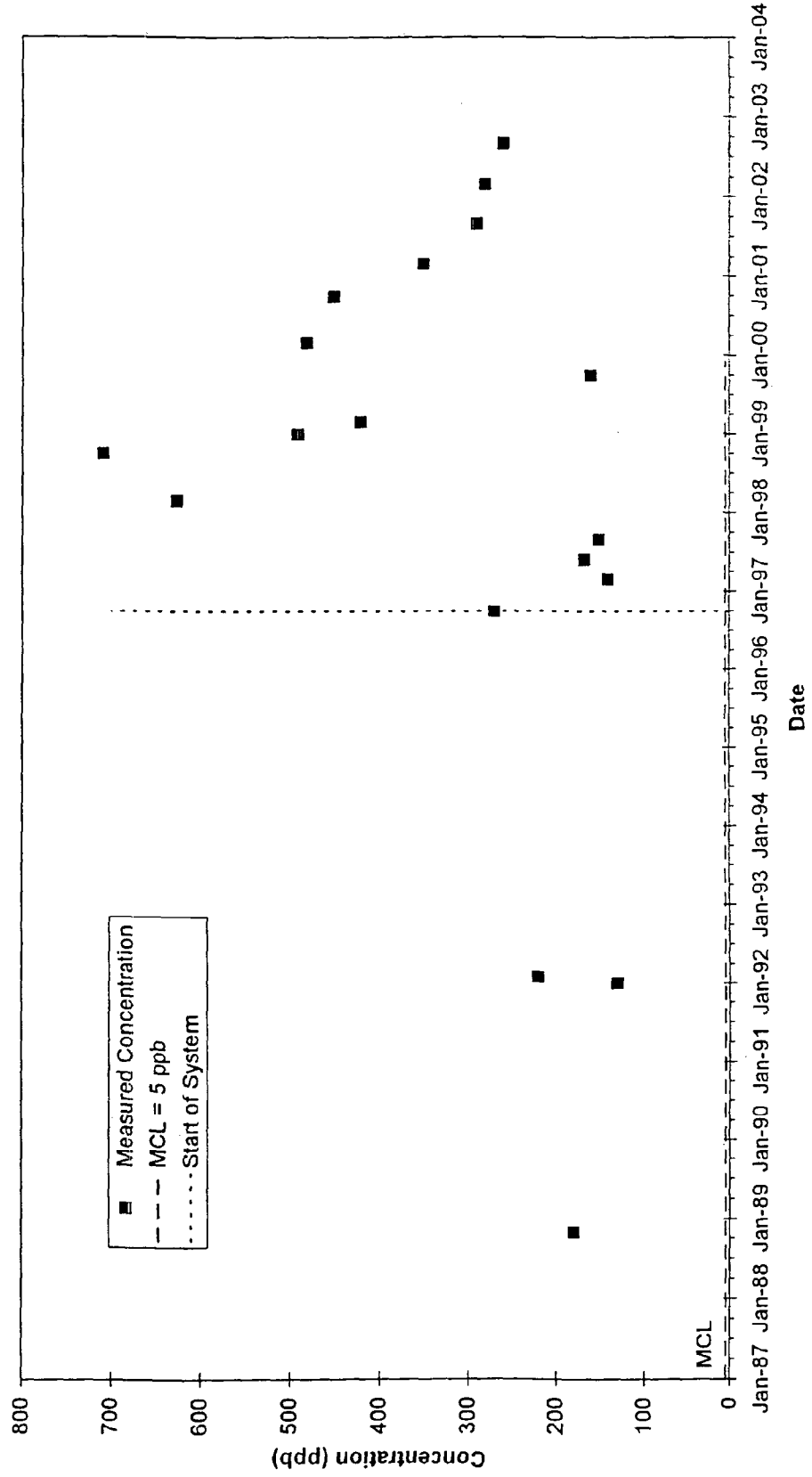
MW-3  
TCE



MW-4  
TCE

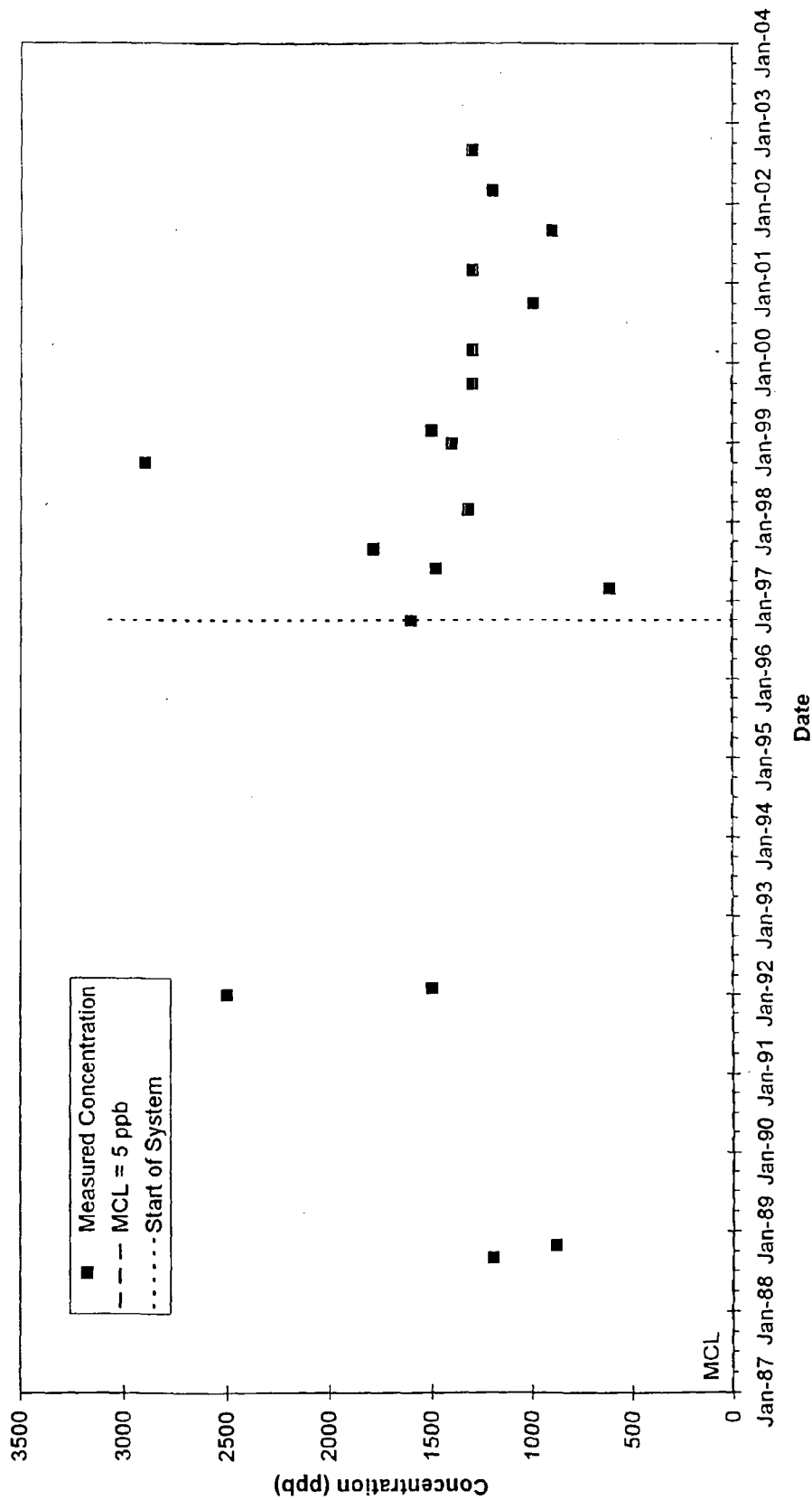


# MW-5 TCE

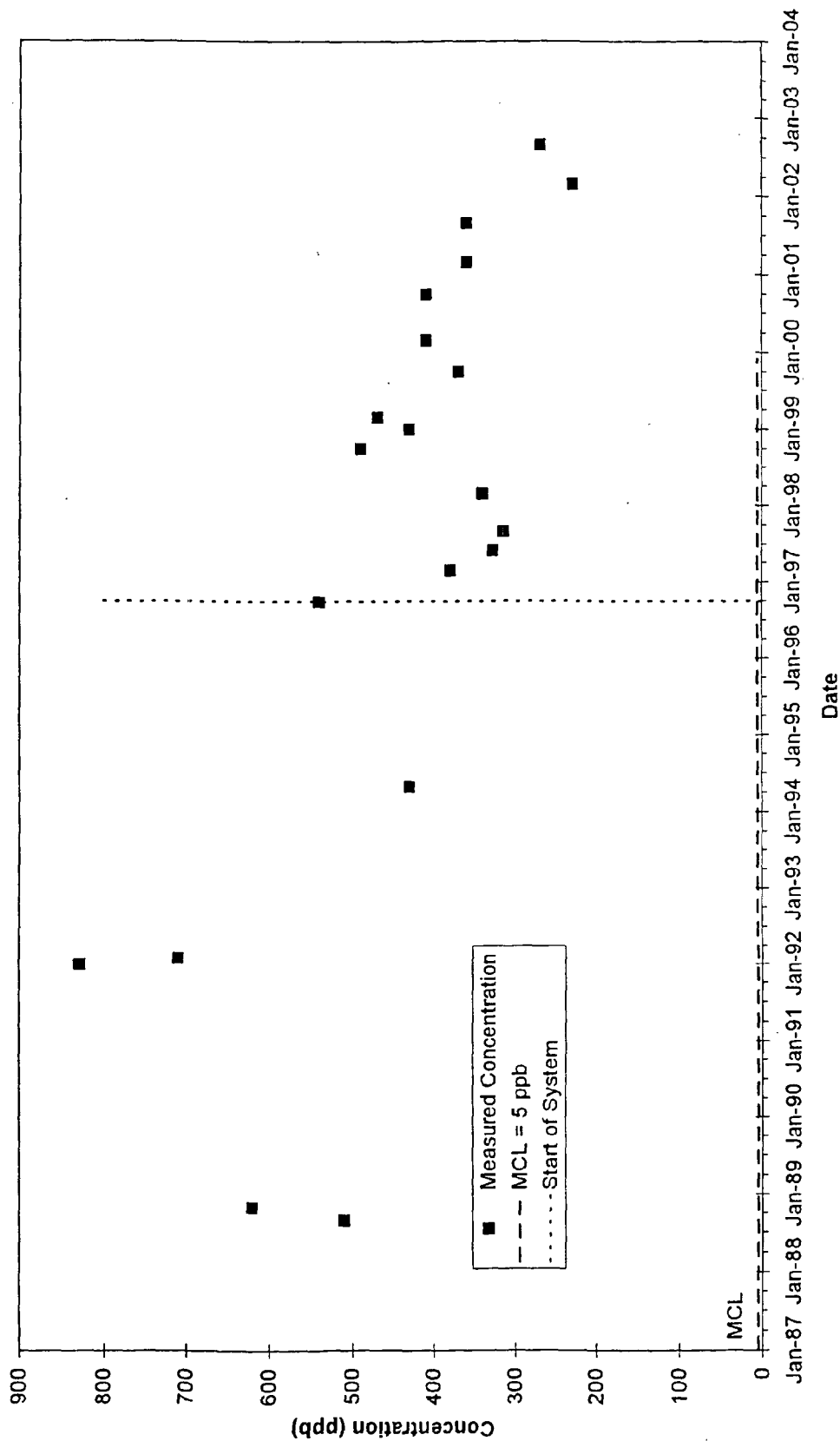




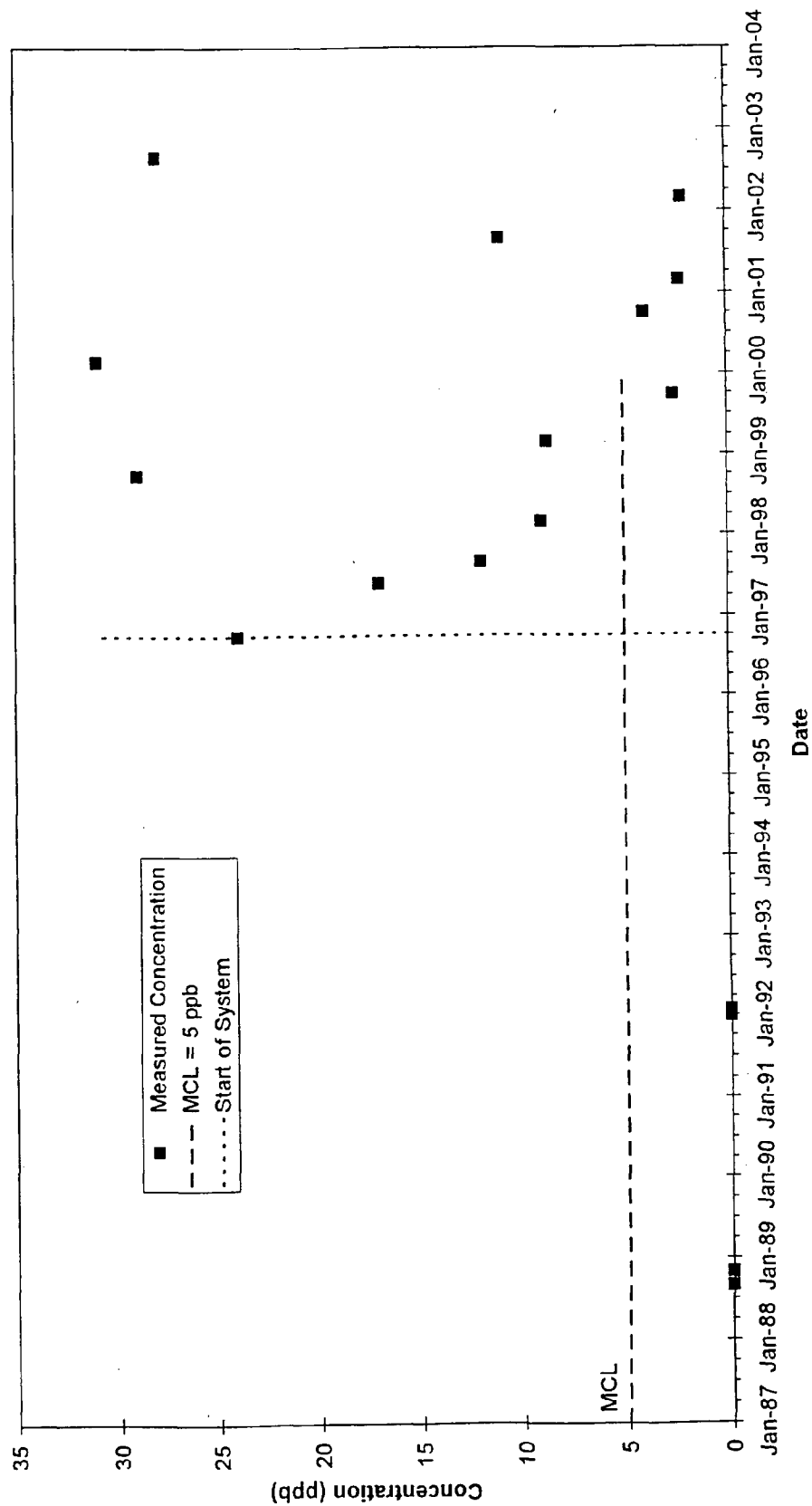
MW-6  
TCE



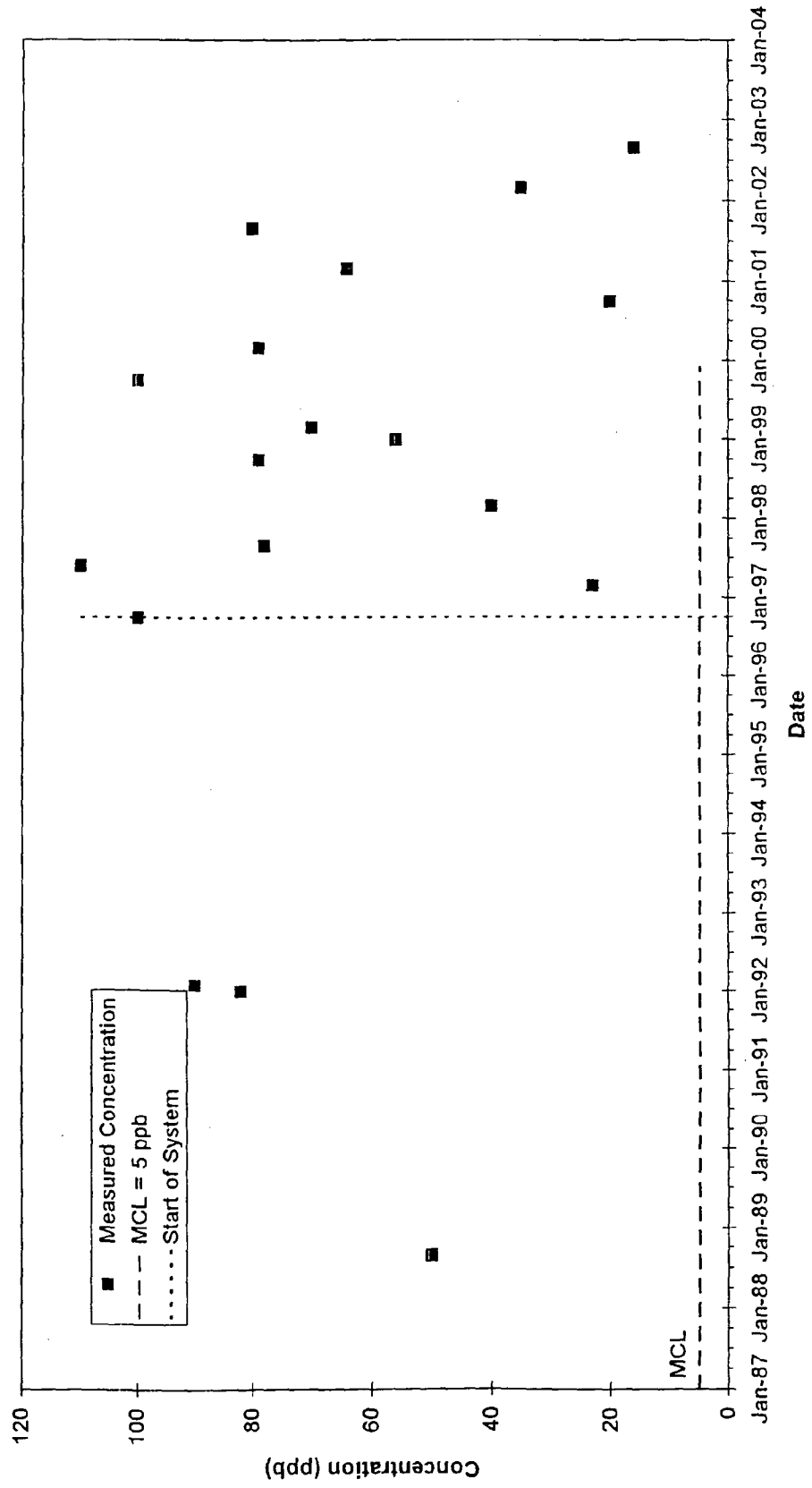
# MW-7 TCE



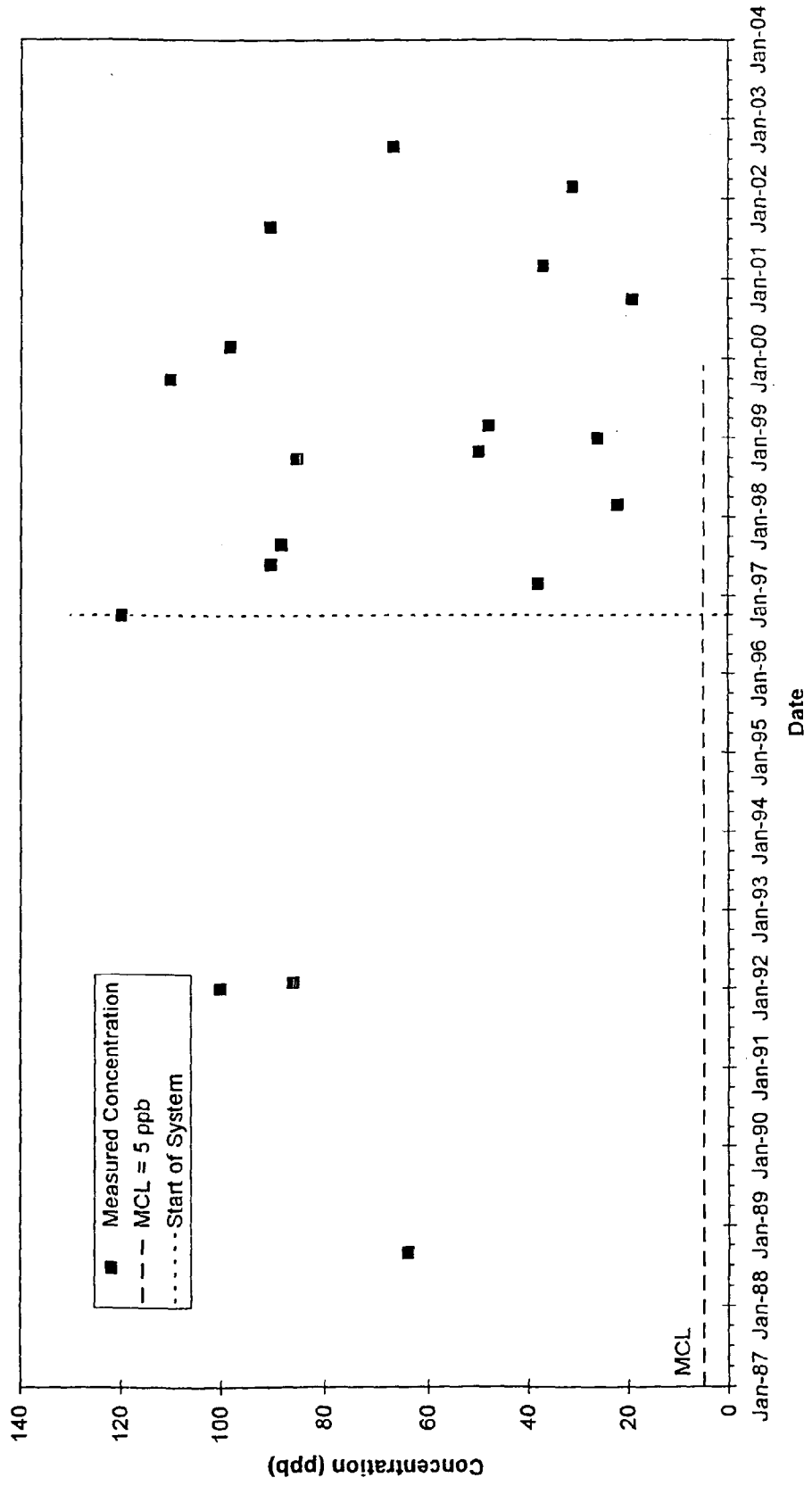
MW-8  
TCE



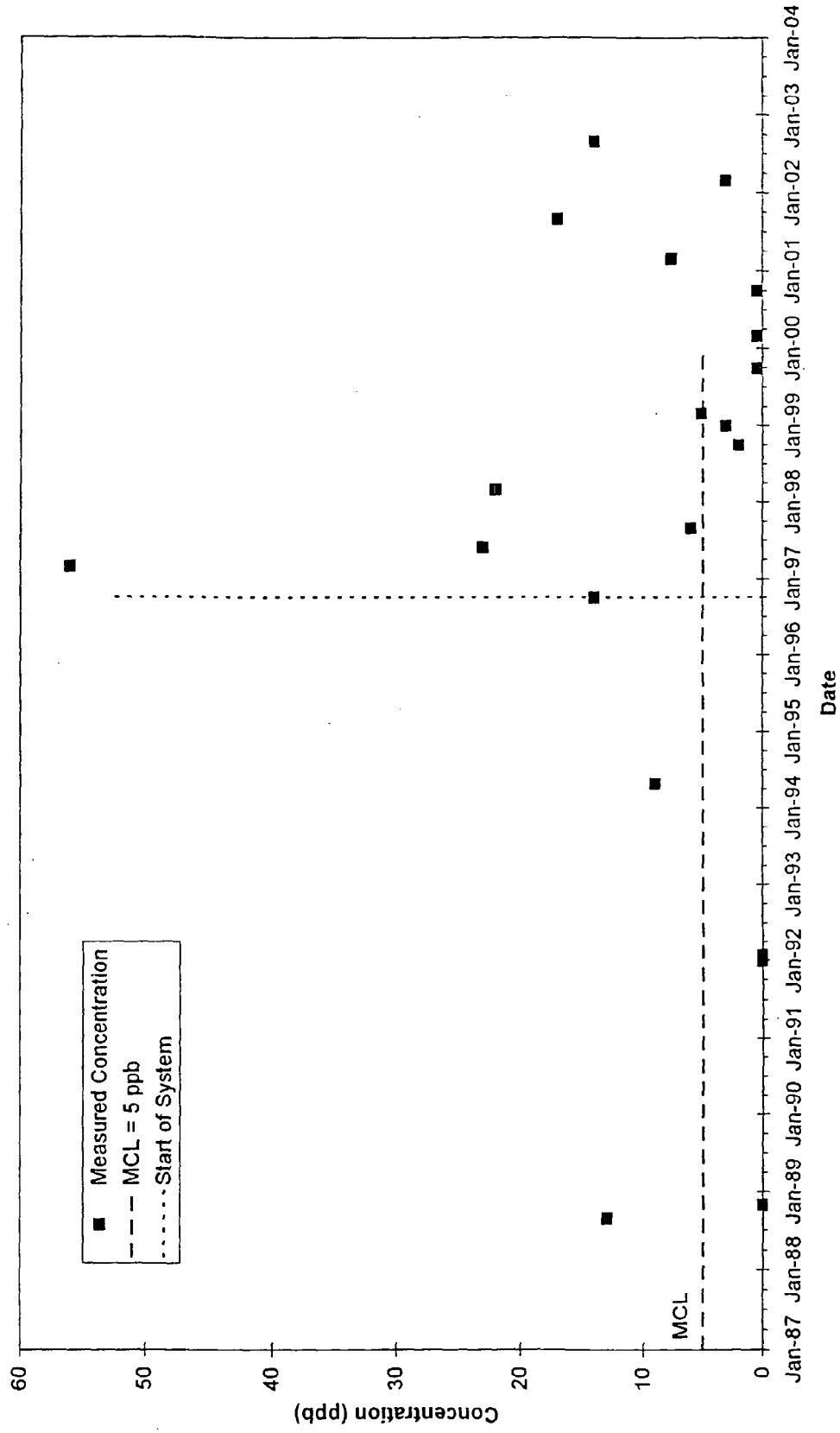
# MW-10A TCE



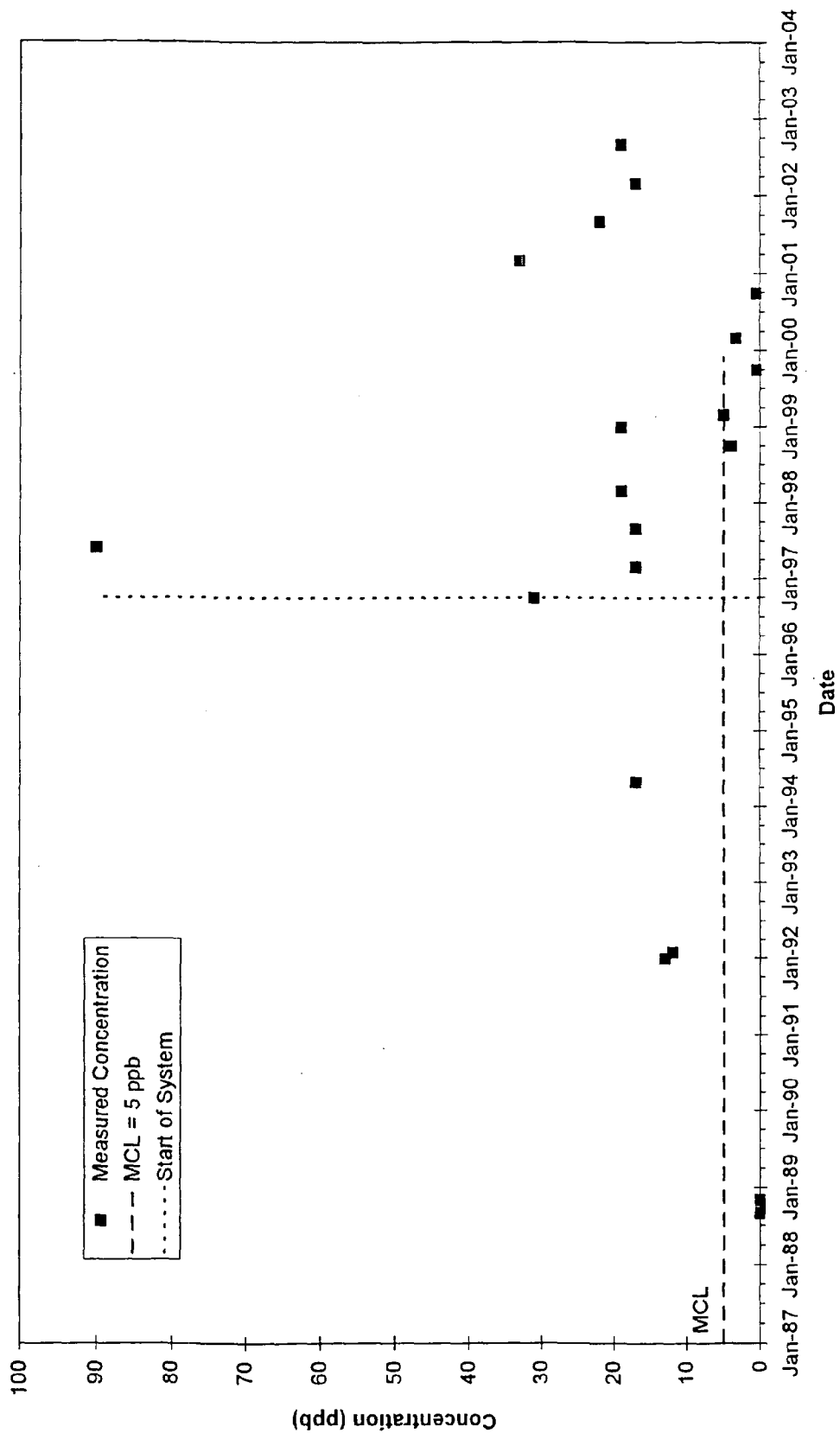
MW-10B  
TCE



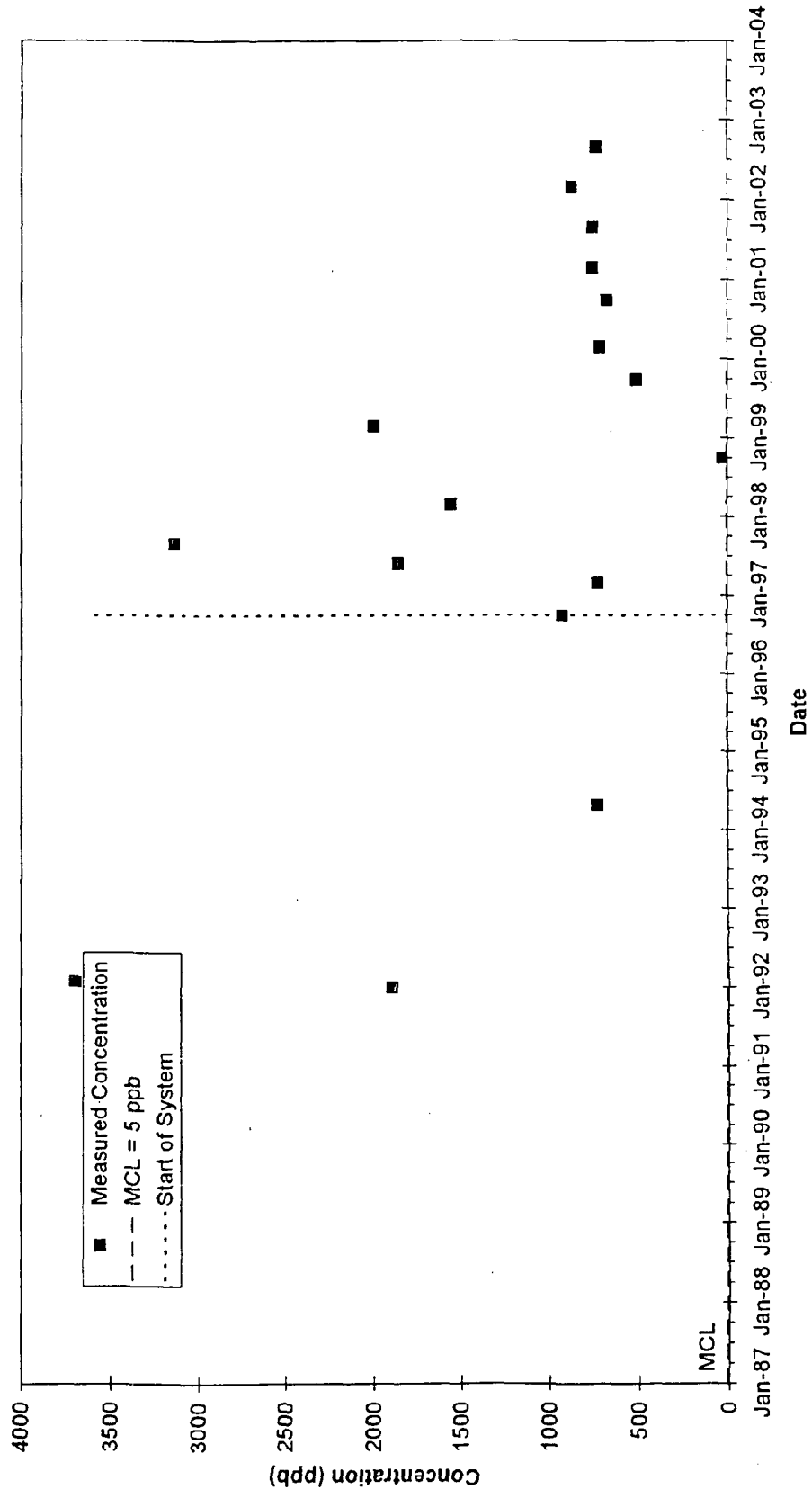
# MW-11A TCE



MW-11B  
TCE

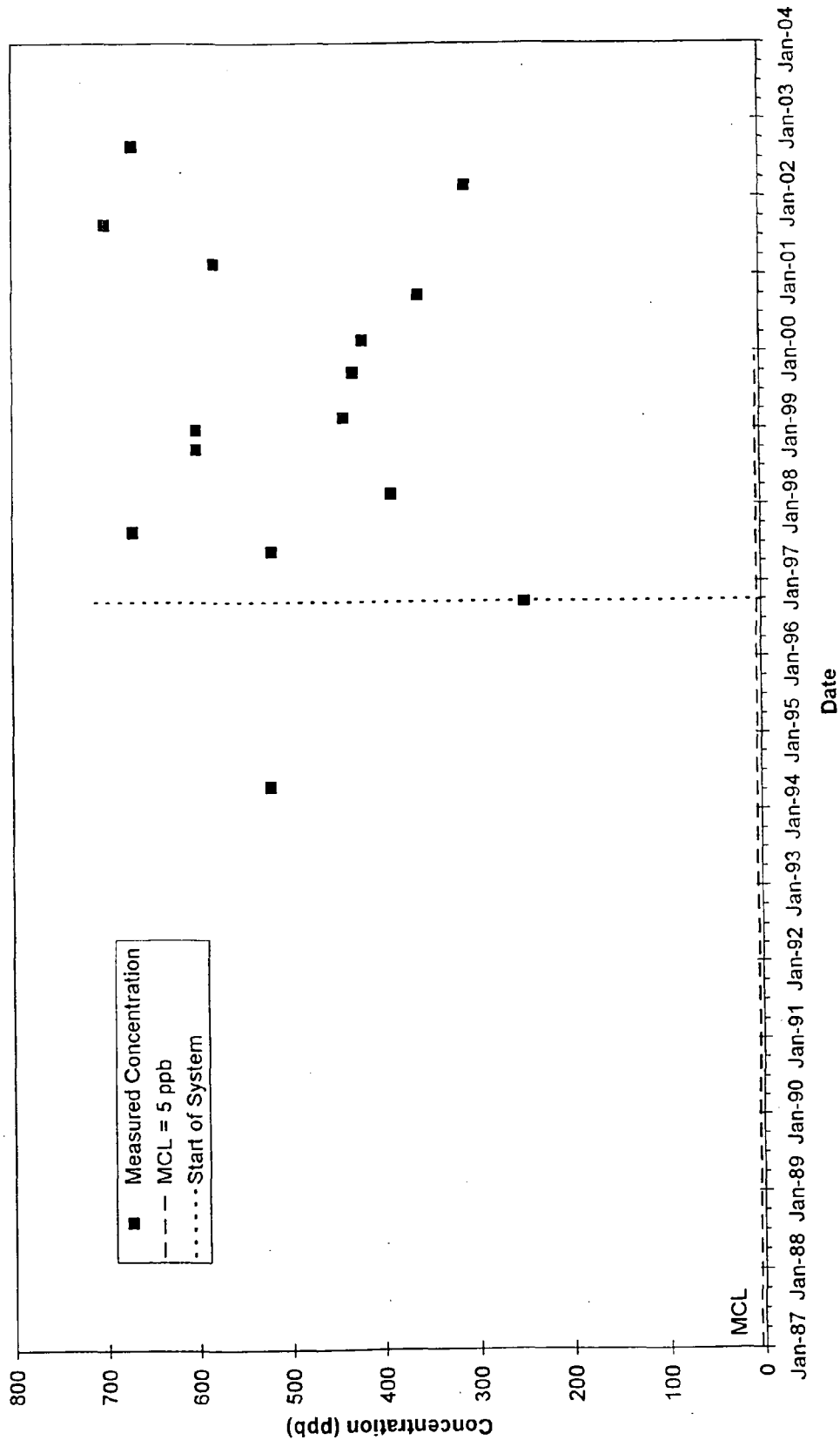


MW-12  
TCE

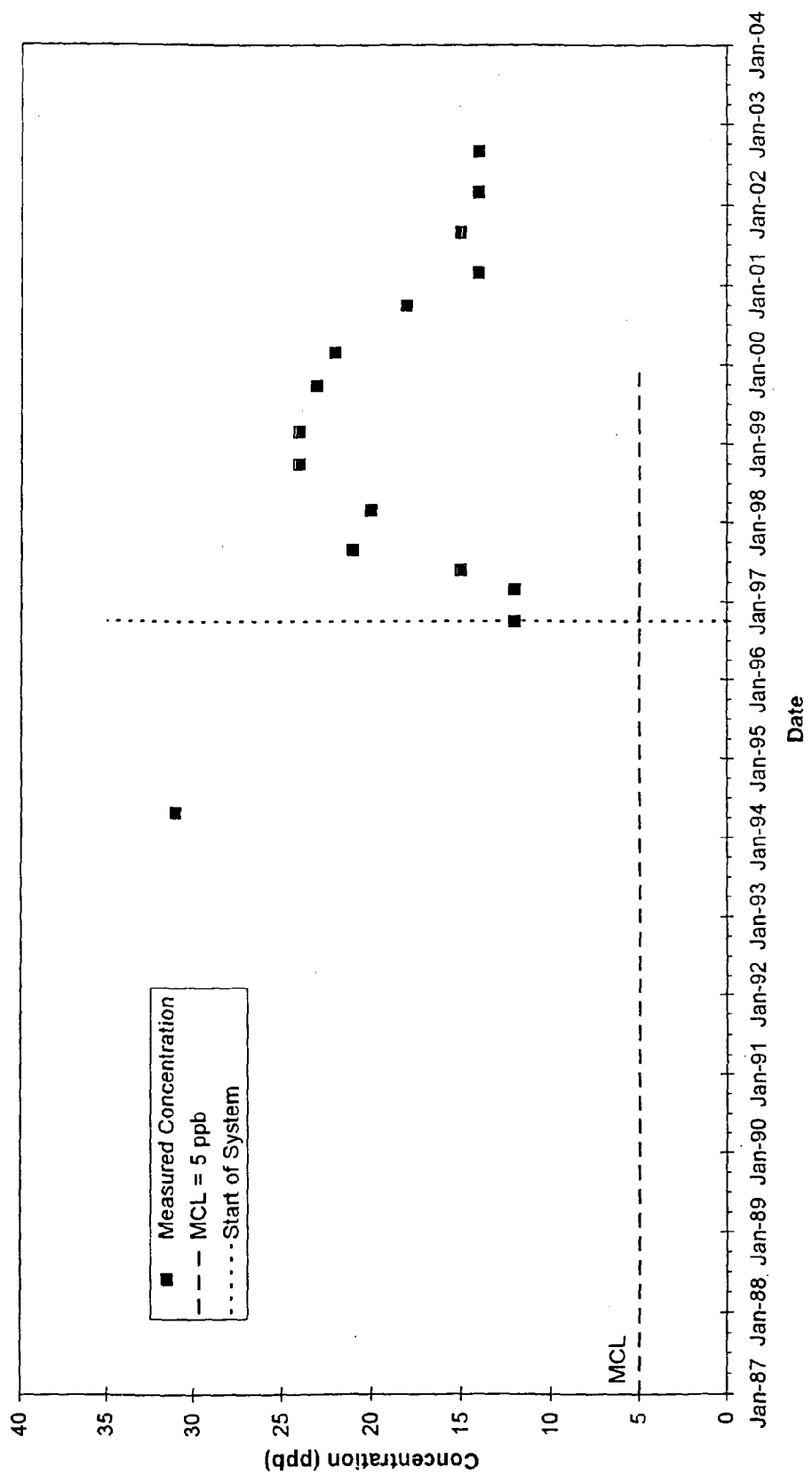




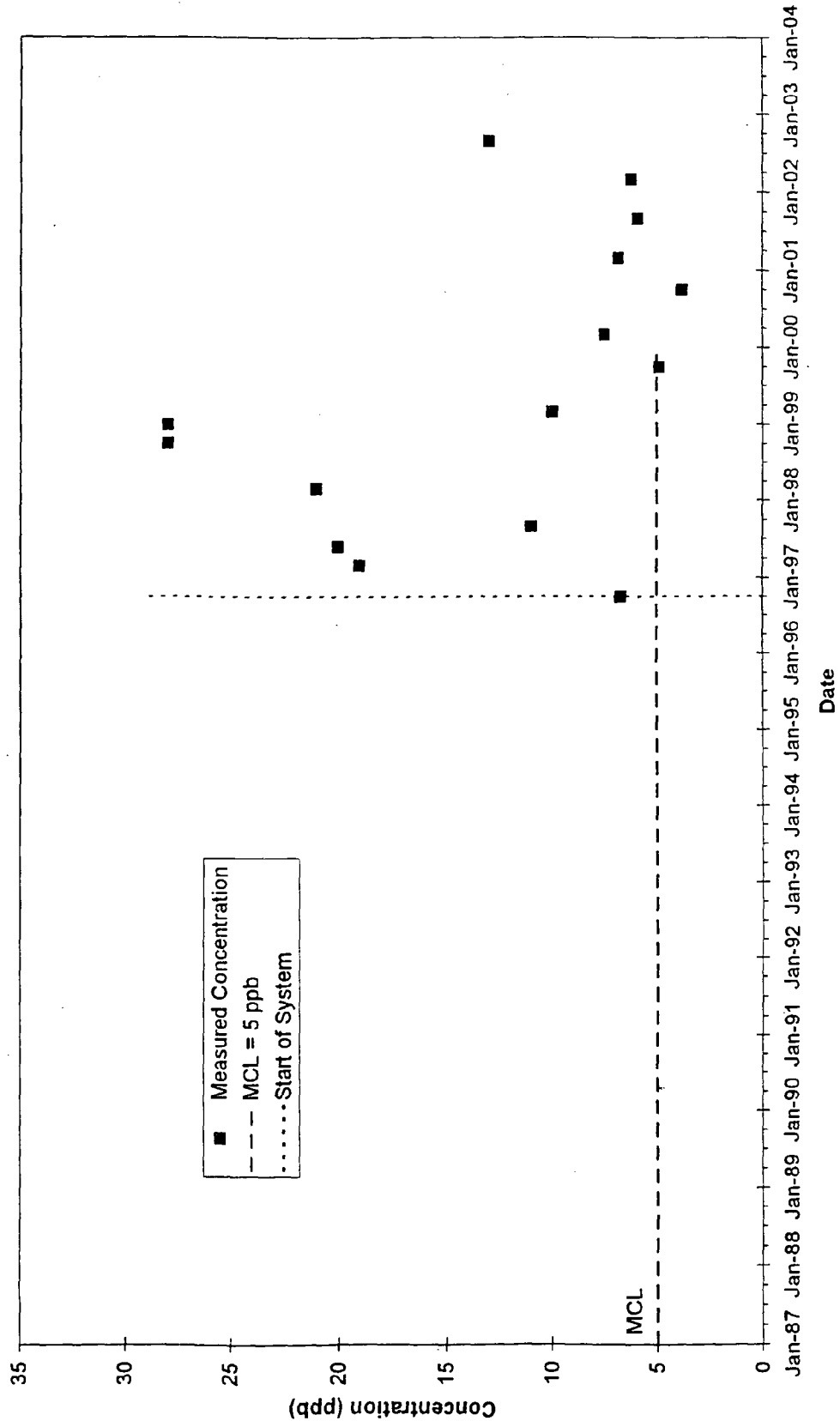
MW-13  
TCE



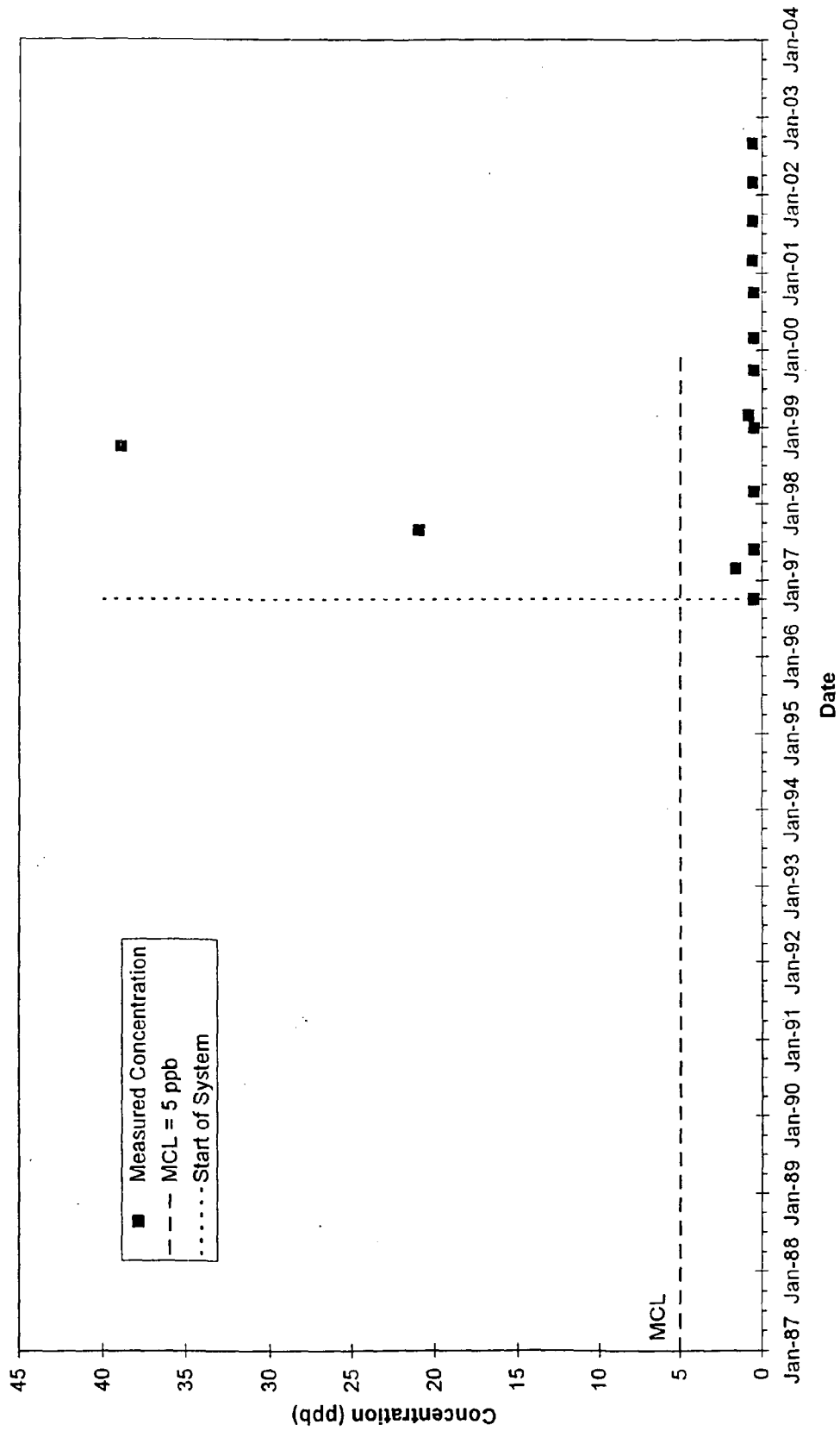
MW-14  
TCE



EW-2  
TCE



EW-3  
TCE



**ATTACHMENT G**

**Copies of Newspaper notice – Community Involvement**

**And**

**Interview Documentation Form**

The U.S. Environmental Protection Agency (EPA) Region 4 and the South Carolina Department of Health and Environmental Control (DHEC) announce the commencement of a Second Five-Year Review for the Carolawn Superfund Site in Fort Lawn, Chester County, South Carolina. Five Year Reviews are intended to evaluate the protectiveness of cleanup actions taken at Superfund sites.

Contaminated media (Groundwater) was addressed at the Carolawn Site in operable unit (OU1). EPA issued a Record of Decision (ROD) for OU1 in September 27, 1989, which selected the recovery of contaminated groundwater using extraction technology and on-site treatment of extracted groundwater by equalization, filtration, and air stripping. The extraction system was constructed and began operating in October 1996. The first Five-Year Review for this Site was conducted in August 1998.

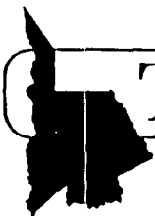
SCDHEC and EPA anticipate that this Five-Year review will be completed by August 2003 and the report will be available for public review or copying at the Chester County Library (100 Center Street, Chester, SC 29706; Ph: 803-377-8145) and Lancaster County Library (313 South White Street, Lancaster, SC 29720; Ph: 803-285-1502).

For further information please contact:

Mihir P. Mehta, P.E. Project Manager  
Federal and Drycleaning Remediation Section  
Bureau of Land and Waste Management-SCDHEC  
8901 Farrow Road  
Columbia SC, 29203  
Ph: (803) 896-4088  
Fax: (803) 896-4292  
E-Mail: [mehtam@dhec.sc.gov](mailto:mehtam@dhec.sc.gov)

OR

Yvonne O. Jones  
Remedial Project Manager  
US Environmental Protection Agency, Region IV  
Waste Management Division-11<sup>th</sup> floor  
61 Forsyth Street, 11<sup>th</sup> Floor  
Atlanta, GA 30303  
Ph: (404) 562-8793  
E-Mail: [Jones.Yvonneo@epamail.epa.gov](mailto:Jones.Yvonneo@epamail.epa.gov)



# The Lancaster News

701 NORTH WHITE ST.  
P.O. BOX 640  
LANCASTER, S.C. 29721  
803-283-1133

## PUBLIC NOTICE

The U.S. Environmental Protection Agency (EPA) Region 4 and the South Carolina Department of Health and Environmental Control (DHEC) announce the commencement of a Second Five-Year Review for the Carolawn Superfund site in Fort Lawn, Chester County, South Carolina. Five Year Reviews are intended to evaluate the protectiveness of cleanup actions taken at superfund sites.

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using extraction technology and onsite treatment of groundwater by equalization, filtration, and air stripping. The extraction system was constructed and began operating in October 1996. The first Five-Year Review for this Site was conducted in August 1998.

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For further information contact:

Mihir P. Mehta,  
P.E. Project Manager  
Federal and Drycleaning  
Remediation Section  
Bureau of Land and Waste  
Management - SCDHEC  
8901 Farrow Road  
Columbia, SC 29203  
Ph: (803) 896-4088  
Fax: (803) 896-4292  
E-Mail: mehtam@dhec.sc.gov  
OR

Yvonne O. Jones  
Remedial Project Manager  
US Environmental Protection  
Agency, Region IV  
Waste Management Division-  
11th floor  
61 Forsyth Street, 11th Floor  
Atlanta, GA 30303  
Ph: (404) 562-8793  
E-Mail:  
Jones.Yvonneo@epamail.epa.  
gov  
647-70-1W-SCDHEC-Bill

This is to certify that the attached PUBLIC NOTICE

was published in THE LANCASTER NEWS in the issue(s) of

6-11-03

Diane M. Sweat

Notary Public of S.C.

My Commission Expires February 22, 2010

**PUBLIC NOTICE**

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For further information please contact:

Mihir P. Mehta, P.E. Project Manager, Federal and Drycleaning Remediation Section, Bureau of Land and Waste Management, SCDHEC, 8901 Farrow Road, Columbia, S.C. 29203; Ph.: (803) 896-4088; Fax: (803) 896-4292; E-mail: mehtam@dhec.sc.gov.

OR

Yvonne O. Jones, Remedial Project Manager, U.S. Environmental Protection Agency, Region IV, Waste Management Division, 11th Floor, 61 Forsyth Street, N.E., 11th Floor, Atlanta, Ga. 30303; Ph: (404) 562-8793; E-mail: Jones.Yvonne@epamail.epa.gov.

555-47-47

11June11c

# THE CHESTER NEWS & REPORTER

104 YORK STREET  
P.O. BOX 250  
CHESTER, S.C. 29706  
803-385-3177

This is to certify that the attached Public Notice  
Second 5 year Review, Fort  
Lawn  
was published in THE CHESTER NEWS & REPORTER in the  
issue(s) of

Jamie McKelvey  
Notary Public of S.C.

My Commission Expires 2-3-2010



### INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review.

Name	Title/Position	Organization	Date
Al Cherry	RPM	EPA-IV	May 28, 2003
Name	Title/Position	Organization	Date
Yvonne Jones	RPM	EPA-IV	May 28 & 29, 2003
Name	Title/Position	Organization	Date
Amelia Magee	Steering Committee Representative	King & Spalding, LLP	June 9, 2003
Name	Title/Position	Organization	Date
Michael Kozar	Managing Geologist	O'Brien & Gere Engineers, Inc.	June 9, 2003 June 20, 2003
Name	Title/Position	Organization	Date
Kenneth Jones	Project Manager	O'Brien & Gere Engineers, Inc.	June 9, 2003 June 20, 2003
Name	Title/Position	Organization	Date
Sam Crisino	Senior Operations Supervisor	O'Brien & Gere Engineers, Inc.	June 20, 2003

## **ATTACHMENT H**

### **Applicable or Relevant & Appropriate Requirements Review**

**MEMORANDUM**

To:           Mihir Mehta, P.E., Project Manager  
                Federal and Dry Cleaning Remediation Section  
                Division of Site Assessment and Remediation  
                Bureau of Land and Waste Management

From:         Gregory C. Simones, P.G., Risk Assessor  
                Federal Facility Agreement Section  
                Division of Site Assessment and Remediation  
                Bureau of Land and Waste Management

Date:         June 26, 2003

Re:           Carolawn Superfund Site  
                Fort Lawn, Chester County, South Carolina

                Review of Cleanup Levels

The above referenced document has been reviewed as it relates to Risk Assessment Guidance for Superfund (RAGS), EPA Region IV Supplemental Guidance to RAGS, and the EPA Comprehensive Five-Year Review Guidance (Appendix G).

The following comments were generated from the review of this document. If you should have any questions, please contact me at (803) 896-4081.

Per your request (verbal, 06/11/03), I have reviewed the Groundwater Cleanup Goals for all eight chemicals listed in the provided table from the ROD (Table 23, Page 65) against current resources readily available through the Internet. The question, "Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?", from the five-year review guidance is used for this portion of the review.

#### **Recommendations Regarding Remedial Levels for Chemicals in Site Groundwater**

- 1) Acetone – Yes, still valid; The cleanup goal of 700 ppb is a lifetime health advisory (LHA) that is currently the only reference value available.
- 2) 1,1-Dichloroethane – Yes, still valid; The states of Iowa and Minnesota use a standard of 70 ppb. No criteria were available originally but it was assumed to behave like other similar chemicals on this list. Cis-1,2-DCE is a similar chemical and has a cleanup goal of 70 ppb.
- 3) 1,1-Dichloroethene (1,1-DCE) – Yes, still valid; The cleanup goal was based on the MCL of 7 ppb, however, there is a reference a lower value of 6 ppb which is based on a LHA and  $10^{-4}$  cancer risk. This lower value does not represent a significant change in risk.
- 4) cis-1,2-Dichloroethene (cis-1,2-DCE) – Yes, still valid; The cleanup goal of 70 ppb was based on a proposed MCL that is now a final MCL.
- 5) trans-1,2-Dichloroethene (trans-1,2-DCE) – Yes, still valid; The cleanup goal of 100 ppb was based on a proposed MCL that is now a final MCL.
- 6) 1,1,1-Trichloroethane – Yes, still valid; The cleanup goal of 200 ppb was based on a MCL that is still current.
- 7) Trichloroethene (TCE) – Yes, still valid; The cleanup goal of 5 ppb was based on a MCL that is still current.
- 8) Lead - Yes, still valid; The cleanup goal of 5 ppb was based on a proposed MCL. The current MCL is 15 ppb.

Therefore, it is recommended that no changes to the reviewed cleanup goals be made.

#### **Selected References**

- 1) ATSDR, 2002, Various ToxProfiles.
- 2) Iowa Department of Natural Resources, 1999, Table 1 – Statewide Standards for Groundwater, Iowa Land Recycling Program, 11 pp.

- 3) Minnesota Department of Health, 2003, Rule Revision - Health Risk Limits for Groundwater Rule, 3 pp.
- 4) Minnesota Department of Health, 1996, Health Risk Limits for Groundwater and Table of Health Risk Limits for Groundwater and Toxicologic Endpoints, 8 pp.
- 5) USEPA, 2003, IRIS, Various tables.
- 6) USEPA, 2003, List of Drinking Water Contaminants and MCLs, 10 pp.
- 7) USEPA, Summer 2002, 2002 Edition of the Drinking Water Standards and Health Advisories, EPA 822-R-02-038, Office of Water, USEPA, Washington, DC, 12 pp.
- 8) USEPA, June 2001, Comprehensive Five-Year Review Guidance –Appendix G, EPA 540-R-01-007, OSWER No. 9355.7-03B-P.

## **ATTACHMENT I**

### **Site Inspection Check Form and Pictures**

## Site Inspection Checklist

### I. SITE INFORMATION

Site name: Carolawn NPL Site

Date of inspection: June 20, 2003

Location and Region: Fort Lawn, SC

EPA ID:

Agency, office, or company leading the five-year review: SCDHEC

Weather/temperature: Cloudy / Partly Sunny and 80°F

Remedy Includes: (Check all that apply)

- |   |  |
|---|--|
| <input type="checkbox"/> Landfill cover/containment | <input type="checkbox"/> Monitored natural attenuation             |
| <input checked="" type="checkbox"/> Access controls | <input type="checkbox"/> Groundwater containment                   |
| <input type="checkbox"/> Institutional controls     | <input type="checkbox"/> Surface water collection and treatment    |
| <input type="checkbox"/> Vertical barrier walls     | <input checked="" type="checkbox"/> Groundwater pump and treatment |
| <input type="checkbox"/> Other _____                |  |

Attachments: ☐ Inspection team roster attached ☐ Site map attached

### II. INTERVIEWS (Check all that apply)

1. O&M site manager	<u>Kenneth (Ken) Jones</u>	<u>Project Manager</u>	<u>6/20/03</u>
	Name	Title	Date

Interviewed ☒ at site ☐ at office ☐ by phone Phone no. \_\_\_\_\_  
Problems, suggestions; ☐ Report attached

2. O&M staff	<u>Sam Crisino</u>	<u>Senior Operations Supervisor</u>	<u>6/20/03</u>
	Name	Title	Date

Interviewed ☒ at site ☐ at office ☐ by phone Phone no. \_\_\_\_\_  
Problems, suggestions; ☐ Report attached

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency SCDHEC-Bureau of Land and Waste Management  
Contact Mihir Mehta Project Manager 6/20/03 803-896-4088  
Name Title Date Phone no.

Problems; suggestions; ☐ Report attached

Agency SCDHEC-Bureau of Land and Waste Management  
Contact Minda Johnson Hydrogeologist 6/20/03 803-896-4030  
Name Title Date Phone no.

Problems; suggestions; ☐ Report attached

4. **Other interviews** (optional) ☐ Report attached.

### III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

<input type="checkbox"/> O&M manual	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input type="checkbox"/> As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A

Remarks \_\_\_\_\_

2. **Site-Specific Health and Safety Plan**

<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input type="checkbox"/> Contingency plan/emergency response plan		
<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A

Remarks \_\_\_\_\_

3. **O&M and OSHA Training Records**

<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
---	--	------------------------------

Remarks \_\_\_\_\_



4. **Permits and Service Agreements**

☐ Air discharge permit

☐ Readily available

☐ Up to date

☒ N/A

☒ Effluent discharge

☒ Readily available

☒ Up to date

☐ N/A

☐ Waste disposal, POTW

☐ Readily available

☐ Up to date

☒ N/A

☐ Other permits

☐ Readily available

☐ Up to date

☒ N/A

Remarks \_\_\_\_\_

5. **Gas Generation Records**

☐ Readily available

☐ Up to date

☒ N/A

Remarks \_\_\_\_\_

6. **Settlement Monument Records**

☐ Readily available

☐ Up to date

☒ N/A

Remarks \_\_\_\_\_

7. **Groundwater Monitoring Records**

☒ Readily available

☒ Up to date

☐ N/A

Remarks \_\_\_\_\_

8. **Leachate Extraction Records**

☐ Readily available

☐ Up to date

☒ N/A

Remarks \_\_\_\_\_

9. **Discharge Compliance Records**

☐ Air

☐ Readily available

☐ Up to date

☒ N/A

☒ Water (effluent)

☒ Readily available

☒ Up to date

☐ N/A

Remarks \_\_\_\_\_

10. **Daily Access/Security Logs**

☒ Readily available

☒ Up to date

☐ N/A

Remarks \_\_\_\_\_

#### IV. O&M COSTS

1. **O&M Organization**

- ☐ State in-house                      ☐ Contractor for State  
☐ PRP in-house                      ☒ Contractor for PRP  
☐ Federal Facility in-house   ☐ Contractor for Federal Facility  
☐ Other \_\_\_\_\_

2. **O&M Cost Records**

- ☐ Readily available                      ☐ Up to date  
☐ Funding mechanism/agreement in place  
Original O&M cost estimate \_\_\_\_\_ ☐ Breakdown attached  
Total annual cost by year for review period if available

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons:

N/A or None

#### V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A

**A. Fencing**

1. **Fencing damaged**    ☐ Location shown on site map  
                                 ☒ Gates secured                      ☐ N/A  
Remarks \_\_\_\_\_

**B. Other Access Restrictions**

1. **Signs and other security measures** ☐ Location shown on site map    ☐ N/A  
Remarks Signs posted on front gate - No Trespassing

**C. Institutional Controls (ICs) — N/A**

**1. Implementation and enforcement**

Site conditions imply ICs not properly implemented

☐ Yes

☐ No

☒ N/A

Site conditions imply ICs not being fully enforced

☐ Yes

☐ No

☒ N/A

Type of monitoring (e.g., self-reporting, drive by) \_\_\_\_\_

Frequency \_\_\_\_\_

Responsible party/agency \_\_\_\_\_

Contact \_\_\_\_\_

Name

Title

Date

Phone no.

Reporting is up-to-date

☐ Yes

☐ No

☒ N/A

Reports are verified by the lead agency

☐ Yes

☐ No

☒ N/A

Specific requirements in deed or decision documents have been met

☐ Yes

☐ No

☒ N/A

Violations have been reported

☐ Yes

☐ No

☒ N/A

Other problems or suggestions: ☐ Report attached

**2. Adequacy**

☐ ICs are adequate

☐ ICs are inadequate

☒ N/A

Remarks \_\_\_\_\_

**D. General**

**1. Vandalism/trespassing**

☐ Location shown on site map

☒ No vandalism evident

Remarks \_\_\_\_\_

**2. Land use changes on site** ☒ N/A

Remarks \_\_\_\_\_

**3. Land use changes off site** ☒ N/A

Remarks \_\_\_\_\_

## VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. Roads damaged

☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks \_\_\_\_\_

B. Other Site Conditions

Remarks \_\_\_\_\_

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☒ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines

☒ Applicable ☐ N/A

1. Pumps, Wellhead Plumbing, and Electrical

☒ Good condition ☒ All required wells properly operating  
☐ Needs Maintenance ☐ N/A

Remarks \_\_\_\_\_

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☒ Good condition ☐ Needs Maintenance

Remarks \_\_\_\_\_

3. Spare Parts and Equipment

☒ Readily available ☒ Good condition  
☐ Requires upgrade ☐ Needs to be provided

Remarks \_\_\_\_\_

B. Surface Water Collection Structures, Pumps, and Pipelines

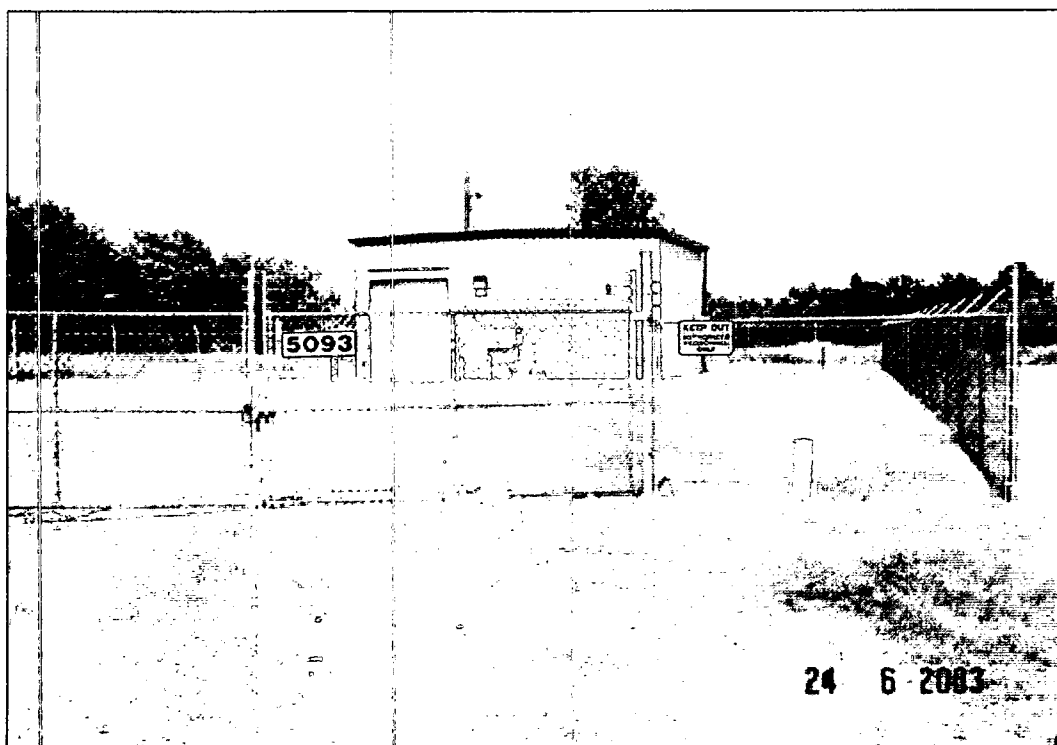
☐ Applicable ☒ N/A

1.	<b>Collection Structures, Pumps, and Electrical</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____
3.	<b>Spare Parts and Equipment</b> <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks _____

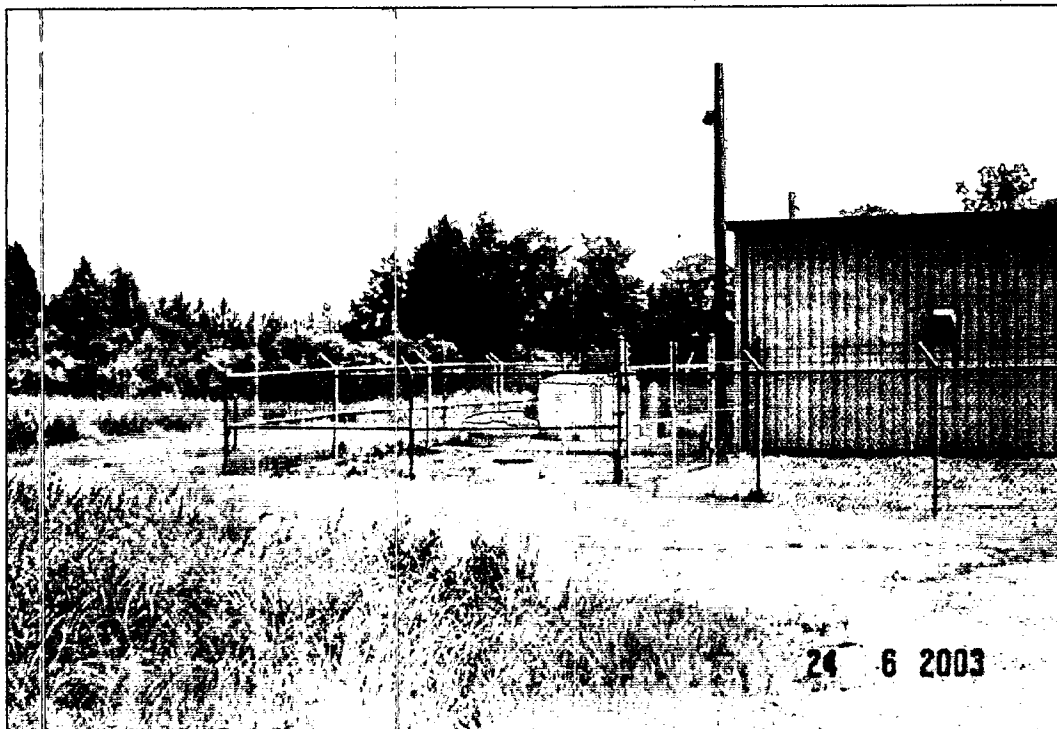
<b>C. Treatment System</b>		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	<b>Treatment Train</b> (Check components that apply) <input type="checkbox"/> Metals removal <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Bioremediation <input checked="" type="checkbox"/> Air stripping <input type="checkbox"/> Carbon adsorbers <input checked="" type="checkbox"/> Filters <u>Sand Filter</u> <input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____ <input type="checkbox"/> Others _____ <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> Sampling ports properly marked and functional <input checked="" type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks _____		

4.	<b>Discharge Structure and Appurtenances</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks _____
5.	<b>Treatment Building(s)</b> <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input checked="" type="checkbox"/> Chemicals and equipment properly stored Remarks _____
6.	<b>Monitoring Wells (pump and treatment remedy)</b> <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input checked="" type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks _____
<b>D. Monitoring Data</b>	
1.	Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality
2.	Monitoring data suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained / <i>In most areas</i> <input checked="" type="checkbox"/> Contaminant concentrations are declining / <i>somewhat</i>

XI. OVERALL OBSERVATIONS	
<b>A.</b>	<b>Implementation of the Remedy</b>
	The remedy is to contain contaminant plume, minimize migration, and reduce contaminant concentration via pump and treat system. The remedy is implemented as stated in the ROD and is being operated successfully.
<b>B.</b>	<b>Adequacy of O&amp;M</b>
	Based on the site inspection and annual reports the O&M at this site is being conducted adequately. No major problems were encountered during this site visit.
<b>C.</b>	<b>Early Indicators of Potential Remedy Problems</b>
	Influence of current extraction system in the areas near MW-10A, MW-10B, MW-11A, MW-11B, MW-7, MW-8, and MW-13 may not be adequate.
<b>D.</b>	<b>Opportunities for Optimization</b>
	Detail system optimization and a follow-up action plan is recommended



Picture 1: Treatment System Building and Fenced Area – Front Side



Picture 2: Treatment System Building and Fenced Area – Back Side

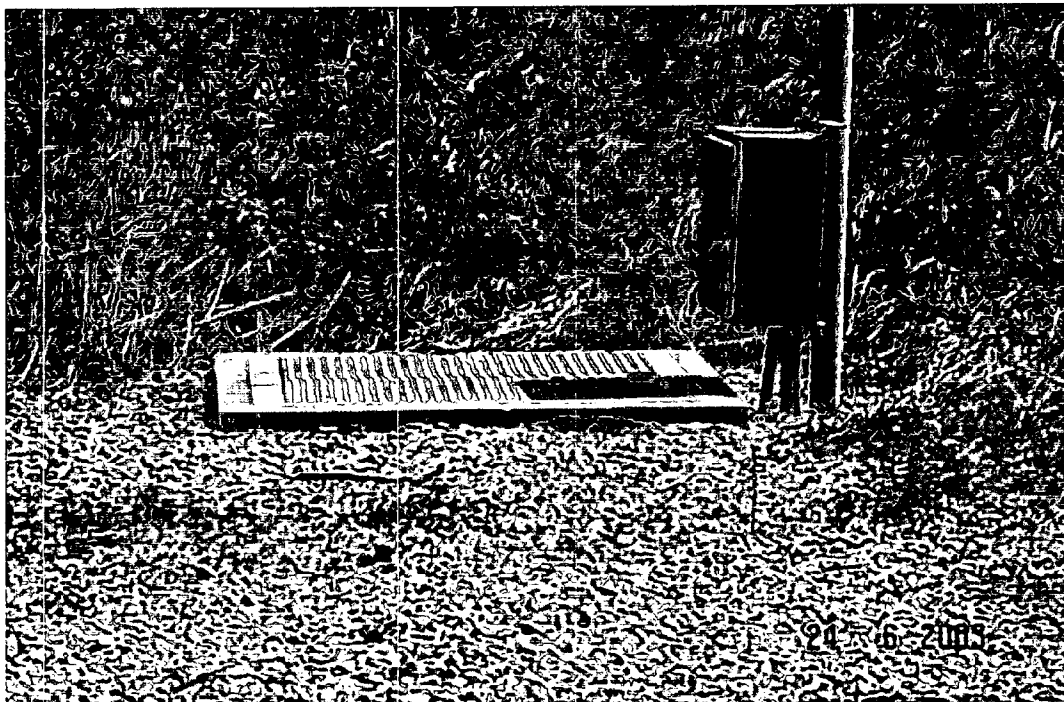


Picture 3: Access Restriction Sign on the Fenced Area

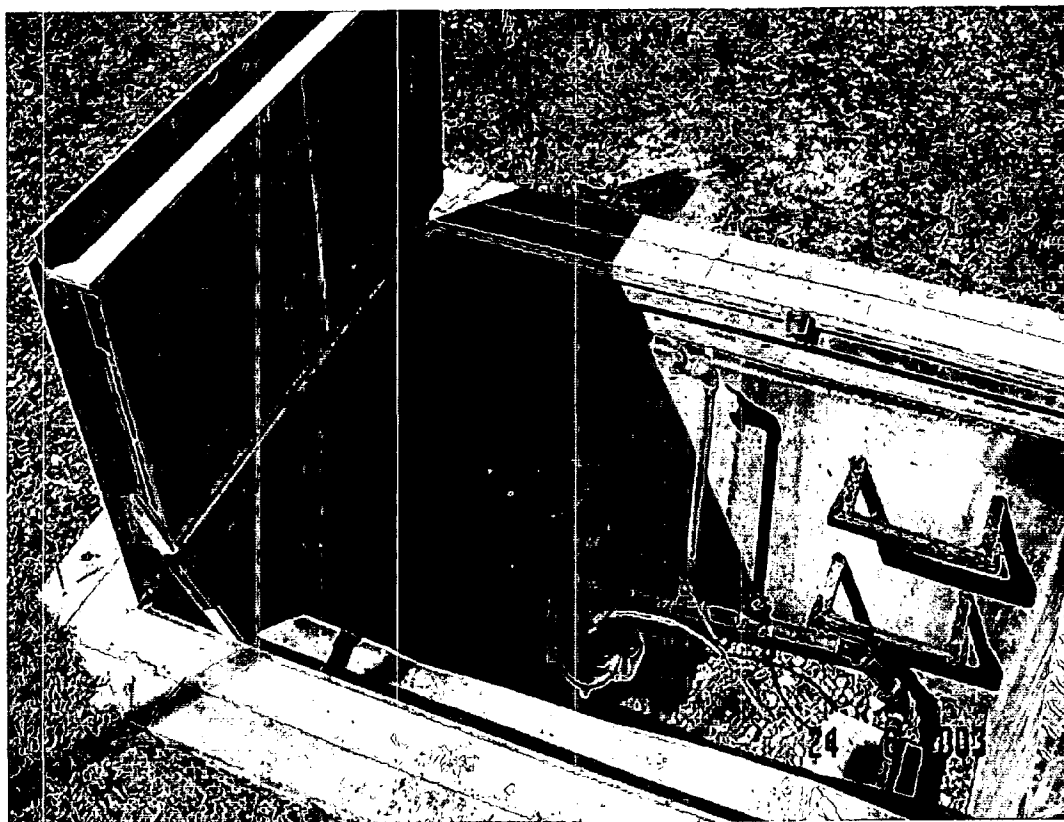


Picture 4: Access Gate to the Site





Picture 5: Groundwater Extraction Well Cover



Picture 6: Groundwater Extraction Well - Inside View



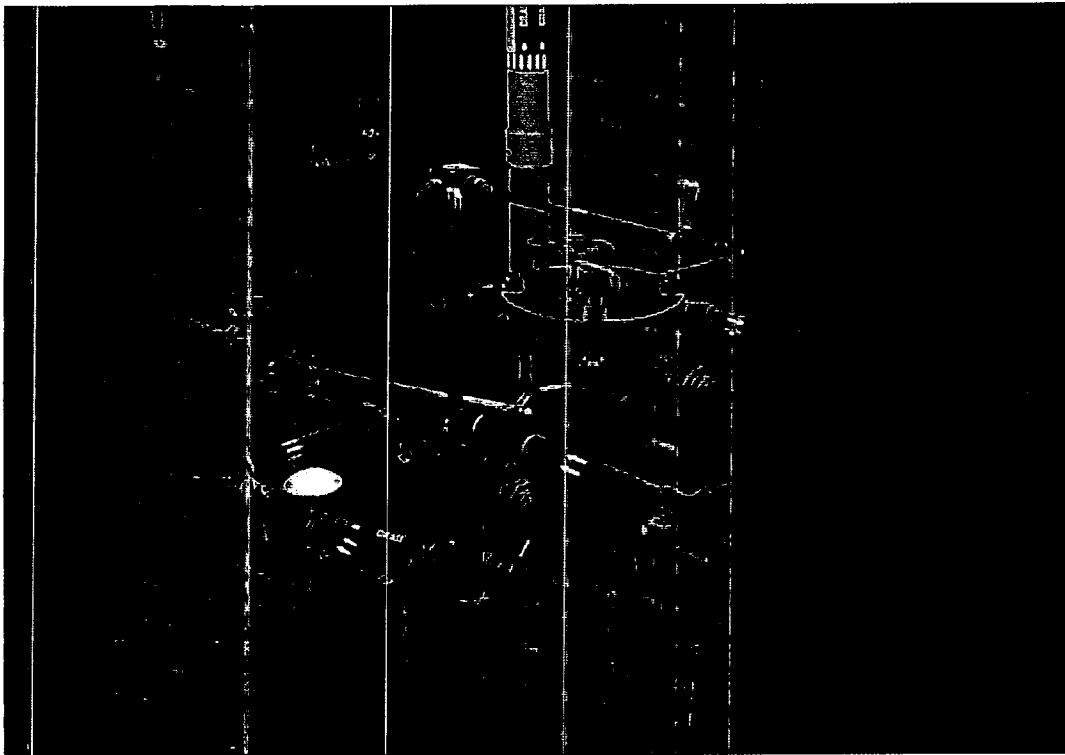
Picture 7: Groundwater Monitoring Wells



Picture 8: Groundwater Monitoring Well – Locked



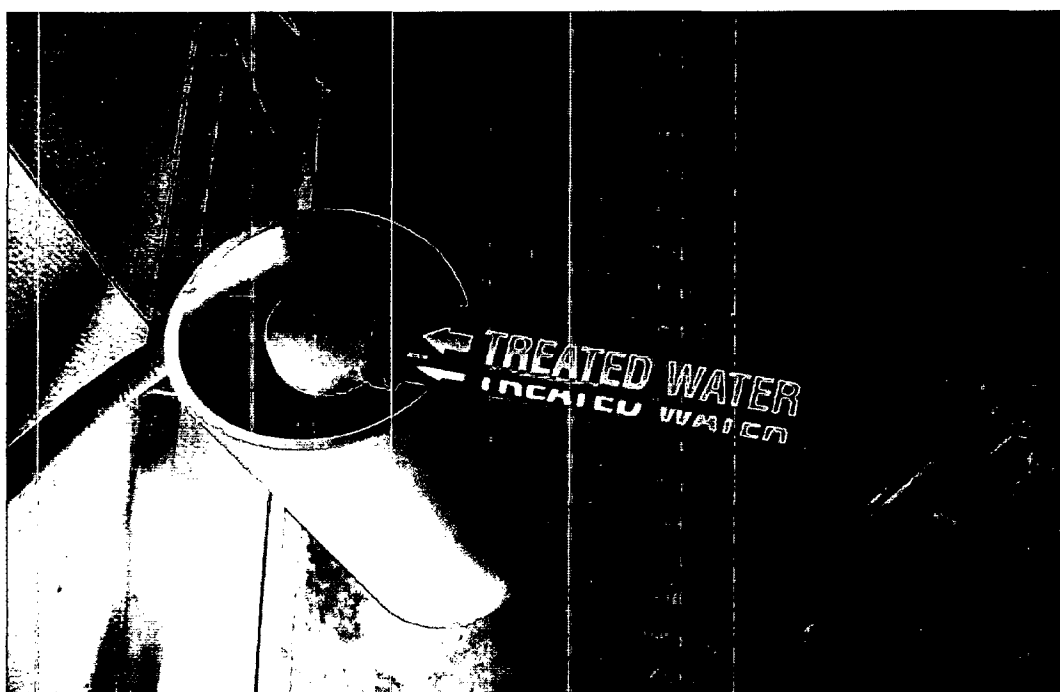
Picture 9: On Site Treatment System – Control Panel



Picture 10: On Site Treatment System – Pipe Connections



Picture 11: On Site Treatment System



Picture 12: On Site Treatment System – Pipe Connection for Treated Water